FOOD MANUFACTURE

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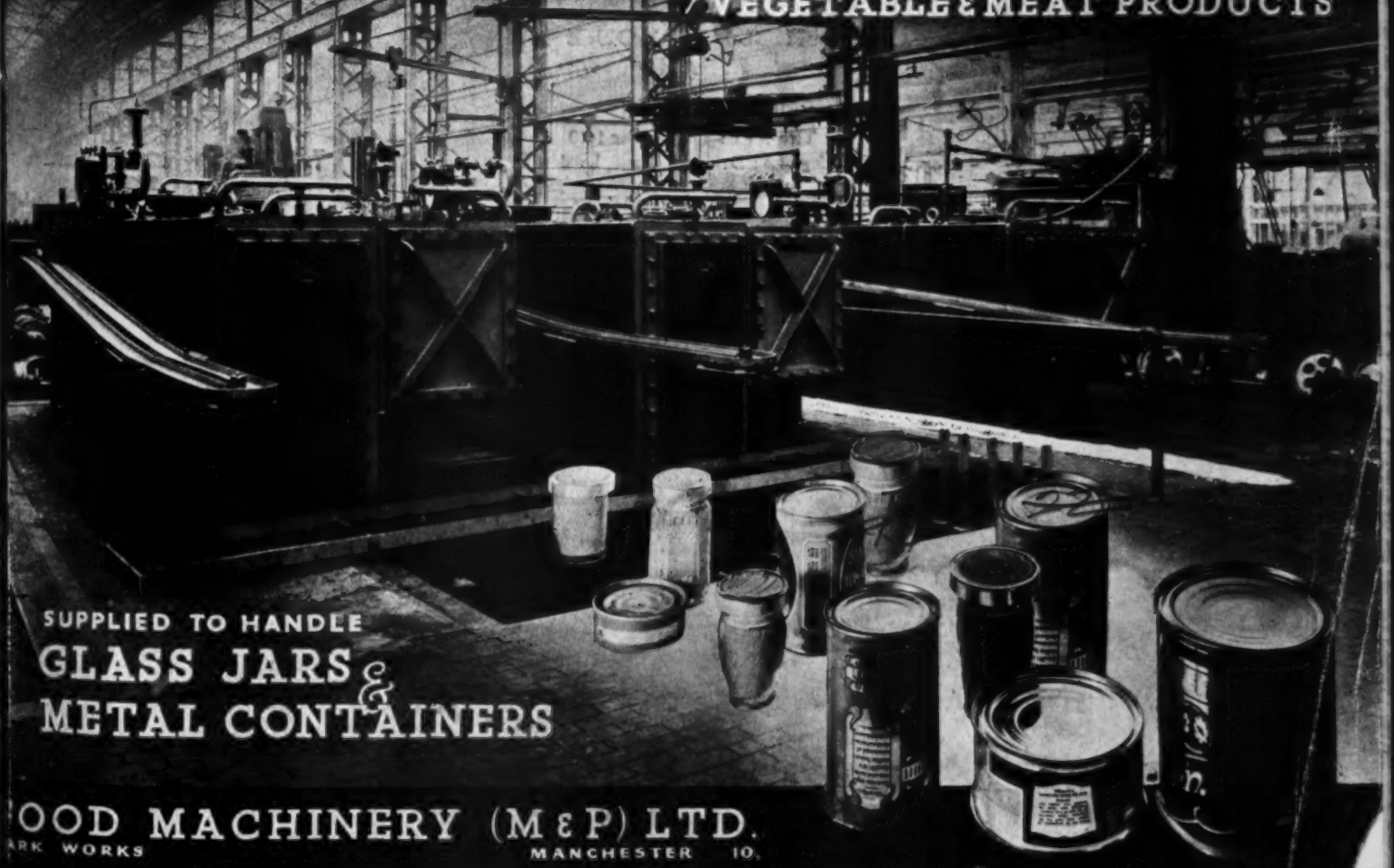

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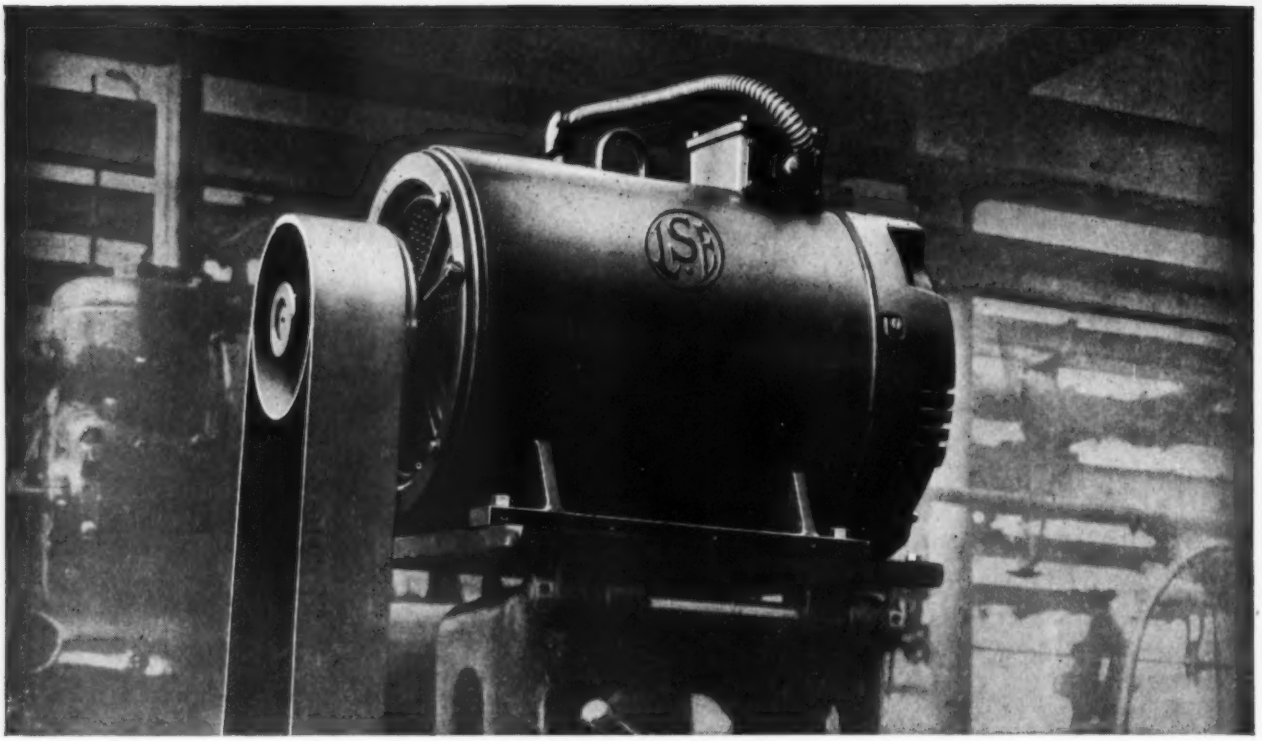

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FOOD MANUFACTURE

Vol. XIII, No. 7 July, 1938

Home-Produced Meat

IT WILL be seen, from a perusal of the review in this issue of the Imperial Economic Committee's Survey of the Production and Trade in Meat, that the British farmer is now supplying a larger part of the home market under the various restriction schemes in force. Since the repeal of the Corn Laws, which reduced the import duty on corn, the farmer has been exposed to the full blast of international competition from a number of nations which have specialised in certain products.

First, the extensive methods of cultivating the prairies of America and the invention of the combine harvester and the application of power to cultivation robbed him of the home grain market. Next, the improvements in methods of refrigeration and the developments of the stock-rearing industry in Australia, New Zealand and South America deprived him of the meat markets at home and curtailed his market for such products as butter, eggs and cheese, and left him with little else than the market for high-class beef. We must therefore welcome this new trend which has arrested economic forces that threatened to deprive us of a great food store and a very desirable type of Briton.

Food and Drugs Bill

At the General Meeting of the Fresh Meat Wholesalers' Federation at Sheffield, Mr. G. W. Rigby reported on the Food and Drugs Bill, which had been under the consideration of a sub-committee. The present Bill was presented to Parliament in December, 1937, and included a clause which might well cause serious concern. It stated that any person who sells or offers or exposes for sale or has in his possession for the purpose of sale, or preparation for sale, any food intended but unfit for human consumption, shall be liable to a fine not exceeding £50, or imprisonment for a term not exceeding three months, or to both such fine and such imprisonment. Mr. Rigby pointed out that if a wholesaler, after slaughtering a beast, found it was diseased, he immediately became liable to penalties—even imprisonment. The Federation decided to appoint a deputation to interview the Minister of Health and to explain to him the implications of the clause. We agree that some measure of protection should be accorded legitimate wholesalers, while not leaving a loophole for those who buy screw beasts.

Gold Coast Cocoa

The value of cocoa products amounts to about £20 million per year (1935 Census of Production). We imported a total of 94,825 tons of raw cocoa last year, over 90 per cent. (85,670 tons) of which came from British West Africa, the producer of more than half the world supply. The West African main crop comes on the market during the twelve weeks from November to January. This means that a large quantity is offered in a short time and during a period when the chocolate manufacturer requires the cocoa not on the coast, or on the high seas, but in his factory for the Christmas chocolate trade. To be sure of his supplies he must therefore buy ahead. In fact, large-scale manufacturers may carry stocks of raw cocoa enough for a year or more, so that chocolate sold in the shops in January, 1938, will have been manufactured in October, 1937, from cocoa bought in December, 1936.

In consequence, buying and selling of the crop begins in August in earnest—before the crop is ready—and buyers and sellers will hedge to cover their position according to the state of the market or their view of its trend. Under such conditions persons with no interest in cocoa except as a subject for gambling take part in market operations, and the speculative element is by far the largest.

Cocoa Marketing

In March of last year the three months Accra quotation on the London Terminal Market was 46s. per cwt., due in part to the general recovery in the price of raw materials in the world markets generally, but also inflated considerably by specu-

lation. With the break in the trade boom last year and the disappearance of speculators the price fell. It was unfortunate for the genuine cocoa buyers that the pool which they formed to protect themselves against artificially high prices should coincide with the fall in prices. It was useless to explain to the West African farmers that the pool would operate to his benefit in the long run by stabilising prices and enabling him to plan his output. They blamed the pool for the fall in prices and in October commenced the boycott. This continued till April of this year, when it was called off, and the Gold Coast Department of Agriculture introduced an Export Ordinance to secure an orderly liquidation of the huge stocks accumulated in the Colony, estimated then at 245,000 tons, some of this being of inferior quality, but with about 200,000 tons marketable. To this must be added this year's minor crop of about 20,000 tons.

Consumption is declining, but June shipments from the coast are expected to amount to nearly 50,000 tons; this is more than the market can absorb and less than the Ordinance quota. Over 150,000 tons of the old crop are unsold, and the buyers have put the new crop at a premium. There seems little hope of a recovery in prices for the coast producers. Prices before the boycott were around 30s. per cwt. and are now around 20s. The report of the Cocoa Commission appointed by the Colonial Secretary to examine the West African trade is expected this summer.

Milk Marketing Board

Some very interesting points were raised by Mr. T. Baxter at the annual general meeting of the Milk Marketing Board on June 8 last. Mr. Baxter is a very zealous leader and he made much copy from the important part played by milk in our agricultural activities. Nothing impresses more than impressive figures, and no doubt many people were surprised to learn that some 130,000 farmers are directly concerned with milk production. The fact that over a thousand million gallons of milk were sold last year will also make lovers of statistics sit up and take notice. He was at pains to account for the drop in production of some six hundred thousand gallons, and puts it down to two factors, the fact that the Government's livestock policy has diverted some of last year's milk farmers to livestock, and also to the higher costs of production due to the rise in the price of feeding stuffs. The latter factor is regarded by Mr. Baxter as the more serious. Our own view, however, is that production has dropped because of the failure of the Board to increase materially the demand for liquid milk, for farmers are getting tired of producing milk to be turned down the drain of "surplus for manufacture". We believe that the only way to increase the milk production in this country is to encourage the consumption of liquid milk and let Mr. Baxter's "secret milk drinkers" come out into the open. This can only be done by reducing the price, and he hit one nail hard on the head when he referred to the inefficiency and wastage of the existing system of distribution. Another way would be to increase the value of milk for manufacture, and this could be done by imposing a subsidy levy on all imported milk products.

Sugar Supplies

It is interesting to note how the Food Defence Department propose to deal with sugar. Conditions under which we obtain our sugar are different from those which held in 1914. Then all the sugar was imported, whereas now nearly a quarter is produced at home, albeit uneconomically. Again in pre-war days half our imports were of refined sugar, now 98 per cent. is raw sugar for refining in this country, and then two-thirds came from Europe, but now the source is entirely ex-Europe. It is obvious, therefore, that the outbreak of another European war would not cause the same serious situation as was the case in 1914, when our important German and Austrian supplies were cut off immediately and the sugar-beet industry was unknown in this country. Sugar is, however, a bulky commodity and requires a substantial amount of tonnage for transportation and, of course, as it now comes from ex-European countries it has a longer voyage. Also, as it is mainly raw sugar, still more tonnage is required. Plans for sugar control have been prepared with the co-operation of the Sugar Commission, the sugar refiners and the British Sugar Corporation. If war occurs all stocks will be commandeered, including sugar afloat to this country. The London Sugar Terminal Market will be closed, outstanding commitments being liquidated. Subsequent purchases of sugar would then be made by the Government by means similar to those adopted by the Royal Commission on the Sugar Supply during 1914-18. There will be a Director of Sugar Supplies. Refineries will have to refine sugar at a fixed rate of remuneration, and imported raw sugar will be allocated in such a way as the Food Controller deems advisable. On paper the whole scheme seems wonderful, but the weakness is that we shall still be

dependent on imported sugar. Nothing is said about obtaining and maintaining in peace times a substantial surplus for storage, and we feel that more attention should be paid to this important matter.

The Aftermath of Drought

The early months of this year have experienced a period of almost unprecedented drought not only in this country but in most parts of Europe. In these lands, where cereal production is very dependent on plentiful spring rains, general perturbation has been experienced among farmers, and the prophets have indulged in some very lugubrious forecasts about the prospects of this year's wheat harvest. A week or so ago *The Times* published reports from special correspondents in France, Germany and Italy about conditions prevailing there. The general concensus of opinion is that before relief came by virtue of the recent rains, there was reason to fear crop failures over a great part of Europe. The worst sufferer appears to be Italy, where, in spite of rains enjoyed by the northern and central provinces last month, the wheat crop will undoubtedly be one of the worst of recent years. The estimate is that production will be about three-quarters of the consumption, so that about two million tons will have to be found outside Italy. Efforts are being made to eke out the supply by dilution with 20 per cent. maize, but in spite of this, considerable importation will be necessary. The position in Germany is more hopeful, and the correspondent there expects a normal yield. It is very difficult to forecast the approximate yields from growing crops, and estimates of wheat harvests are notoriously uncertain, but it appears certain that Europe will require a considerable amount of imported wheat. Against this is the prospect of a bumper harvest in America, so that European buying may very well act as a stabiliser for a market which otherwise might become very sick.

Dr. Edward Ray Weidlein

We recently had the pleasure of meeting Dr. E. R. Weidlein, Director of the Mellon Institute, Pittsburgh, who arrived in Europe last April as Delegate of the U.S. Government and National Academy of Science to the Tenth International Congress of Pure and Applied Chemistry and to the Thirteenth Congress of Industrial Chemistry at Rome. During this, the first vacation he has had for many years, Dr. Weidlein, accompanied by Mrs. Weidlein, has avoided official engagements in England in order to have a complete rest. This, however, has not prevented him from investigating the progress of new developments here and on the Continent, as well as meeting old friends. Dr. Weidlein told us that, despite the recession in America, any really competent scientist was assured of employment and that research men were particularly sought after. This demand indicates an awakening by industry to the fact that "the security of society makes it essential that the services of men of science shall be wisely and fully utilised."

At the Mellon Institute, where fellowship work is pursued on a contract basis with firms known as "Fellowship Donors", investigations have been carried out on such subjects as the influence of aluminium on nutrition, synthetic sausage skins, gelatine, coffee, bread improvers and cereal breakfast foods. In the matter of synthetic sausage skins the Institute began its researches in 1916 and showed grim persistence in the face of repeated failures and disappointments, to be rewarded with success ten years later.

American gelatine manufacturers subsidised an exhaustive enquiry into the properties and applications of gelatine, under Dr. Downey, and the results were used for a co-operative advertising campaign, scientifically conducted, which was proved to result in increased sales.

Food Control

In 1928 Sir William Beveridge wrote a book about food control in England during the war of 1914-18, and he ended it with a much-quoted and now famous phrase: "Here, forms and circulars, reports and instructions, schemes and counter-schemes and plans for another war, all so many monuments of toiling ingenuity, lie mouldering gently into dust and oblivion, lie buried, please God for ever". Sir William's pious hope has not been granted, and the archives have not been left long enough for much dust to accumulate or decay to set in. Within a mere decade all the papers and records of the efforts—futile though most of them were—of 1914-18 to evolve a workable system of food control, that would keep the civilian population calm and satisfied and at the same time keep the army in fighting trim, have been dragged once more into the daylight and given careful attention by a special department of the Board of Trade, created specifically for this purpose. We do not know all that our present department of Food Defence Plans has done, nor are we likely to

be told, but for the modest price of 9d. anyone can obtain Sir Henry L. French's report, which contains a lot of information. The main efforts seem to be to make sure of an uninterrupted supply of all essential foodstuffs in the United Kingdom, to reduce, as far as possible, the inconvenience and delay caused by any dislocation in the movement and distribution of foodstuffs which may result from war conditions and to ensure that supplies of essential foodstuffs at controlled prices are available to meet the requirements of all types of consumers in all parts of the country. Let us hope that Sir Henry's efforts in this direction will meet with abundant success and that if an emergency does arise he will have the goods at his disposal for delivery.

The Upper Air

Man is born to trouble as the sparks fly upward, but there is trouble much higher than any spark can fly. Professor A. C. Hardy, writing in *The Observer*, describes the use of kites to make insect collections at heights up to 2,000 feet and more, and it is hoped to learn much about the spread of insect pests, not only from one part of the country to another, but from the Continent. According to a preliminary report, most of these high-flying insects are weak in flying power. What they lack in strength they make up on wing-spread. Presumably like human "gliders" they rely largely on air currents. Among corn pests alone, the wheat aphis has been found at heights up to 1,600 feet; the fruit fly often at 600 feet, and the minute corn thrips, which shrivel up the ears of wheat, at 450 feet.

The aphis, which gets highest, has a wing-spread of more than three times its body length. When the first drop in numbers is over, after leaving ground level, there is little falling off in the insect population from about 750 feet upwards. In some cases there are even more of a particular insect between 1,000 and 2,000 feet than between 150 and 250 feet.

Essential Commodities

The Essential Commodities Reserves Bill was issued on May 26, and there are in it many points of importance to manufacturers. The purpose of the Bill is to enable the Board of Trade to obtain information as to essential commodities and to make provision for financing certain purchases of such commodities already made and additional purchases likely to be needed. Traders will be required to give full information concerning stocks held and the output capacity of plant for manufacturing commodities and the space available for storage. The Board of Trade will be enabled to create reserves of essential commodities either by inducing traders to increase their own stocks and improve the facilities for storage, or by purchasing stocks to be held by the Board. Provision is made to safeguard traders from any sudden disposal of stocks accumulated by the Board. One clause provides for the establishment of a "revolving" fund called the "Essential Commodities Reserves Fund", which is to be under the control of the Board. The cost to the Exchequer of the proposals of the Bill cannot be stated as the nature and quantities of the reserves to be acquired and maintained may vary from time to time. Payments will have to be made for purchases, maintenance of commercial stocks, storage and for ancillary purposes such as building operations, and will be met by annual vote. In other words, the Board of Trade is being offered a blank cheque, always a dangerous procedure, but in this case, we fear, unavoidable.

More Maggots

We referred recently to the "grub in the chocolate case", and since then our attention has been called to another action heard by Mr. Justice Charles on December 20 last at the Sussex Assizes. The action was taken against a firm of fishmongers by a woman who became ill after eating vermicelli, which, it was alleged, contained maggots. There was no question as to the presence of the maggots in the vermicelli; the point was to prove that the vermicelli had been purchased at the shop in question. This the plaintiff was unable to do. In summing up Mr. Justice Charles said that as to the effect of the incident on the plaintiff's nervous system the complaints were grossly exaggerated. "If I were able to find for the plaintiff I should find for some small sum, but I cannot find for her. It is regrettable that she should have made so much of a trifling and trumpery illness. It is essential, as a preliminary to success, that she should prove that the vermicelli was bought from defendants. That she has failed to do." We are not concerned with the rights and wrongs of this particular case or whether the woman's illness was trumpery or not. We have referred to it as a further example, warning persons not to bring such actions against traders unless they are quite certain that they have all the evidence necessary to gain the verdict. In many cases litigation is entered into in haste and regretted at leisure.

OUR MEAT SYMPOSIUM

THE factory of **Shippams of Chichester** is described. Much might be written upon meat pastes. As is said in the article, "there are pastes—and pastes". It is impossible to make a silk purse out of a sow's ear. We will leave it at that. Shippams insist upon the absolute adherence of the contents of their pots to the description on their labels.

◆

H. G. Lawson Johnston writes about **Modern Abattoirs**, and touches upon the question of centralised slaughtering. *Apropos* of the latter, Sir Francis Boys, speaking at Brighton at the Annual Conference of the Midland and Southern Market Authorities Association, said that, "before long, statements would be made summarising the principal features and desirable operations at central slaughterhouses and the extent of the areas which should be subject to control of slaughterhouses in connection with such schemes".

Mr. Lawson Johnston speaks with authority on abattoir matters from his wide experience in the Argentine Republic and other countries.

◆

T. Crosbie-Walsh, F.I.C., has written a rapid review of **some aspects of meat canning** in this and other countries.

◆

A special contributor describes one of the modern methods of arriving at meat processing times and temperatures. The article **Meat Rations** contains a lot of information regarding automatic processing, a fairly recent innovation in meat and vegetable canning.

◆

Osman Jones, F.I.C., is a frequent contributor to FOOD MANUFACTURE. His article on some of the **new aspects of meat curing** will be read with interest. Curing is a thing which has been done for many years in an empirical way, yet, as Mr. Jones says, there are still various aspects of it which have still to be investigated.

In connection with curing, there is a slight temptation to mention nitrite, but it would savour of flogging a dead horse. The authorities are still obdurate, and we shall soon be the only country which solemnly prohibits its use.

◆

J. Hoveman's Cryo-Vac Process for the **quick freezing of quarters of beef** and the use of a thin latex covering, which is brought into close contact with the meat by the application of a vacuum, is one which aroused interest in the U.S.A. at a recent conference.

◆◆◆

SHIPPAMS

THERE IS romance or fascination, or what you will, attached to these old-established English firms. The main front of the factory in Chichester bears the legend "1750". Just that. It means that nine years before Wolfe took Quebec and nineteen years before the birth of Napoleon Bonaparte, somebody with the name of Shippam founded a little dynasty of industry. Mighty men of valour have founded dynasties since then, and to-day they are represented by a few pages in the history books. Poets, priests, kings, statesmen have played tremendous parts. The industrial and mechanical revolutions arose. Through all these times the Shippams have quietly gone about their business—the business of doing one thing well—and are impregnably entrenched at Chichester, in a factory which is an apotheosis to those dead and gone progenitors who laid the foundations of the business and built it brick by brick.

Male Labour

No less than seven members of the family actively carry on the old traditions. They have what might perhaps be called in these hard, commercial times, some strange ideas. To the visitor accustomed to seeing food factories, the first thing that strikes him is the entire absence of female labour. Every bit of the work is done by men. The majority of them have been employed there since leaving school. But as they grew up they were not replaced by younger labour. They were kept on. About 80 per cent. of them are married and their wives stay at home. One can imagine that they are good cooks if, as doubtless is the case, their husbands take Shippams' ideas home with them.

There is a five-day working week. Conversation with the men demonstrates how much this is appreciated. Up to three years ago no press advertising was done; yet somehow Shippams has had, for many years, a world-wide name.

The Factory

Immediately on entering the factory the excellence of the lay-out impresses. Every operation seems almost imperceptibly to merge into the next one. There are no "bottle-necks"; no overcrowding at any point. That is one of the tests of good organisation.

The Pastes Department

In seeking an epithet for this department one might borrow that of one of the visitors. "Battleship Smartness". Long lines of burnished jacketed pans—bright to dazzlement. Walls of white glazed bricks. Even the insulation material covering the steam pipes which heat the pans is chastely hidden by tubes of polished metal! The floor tiled—and dry. No patches of mixed fat and water to lure the unwary visitor towards an ignominious fall.

A peep into the various pans gives glimpses of incredible quantities of shrimps, lobsters, salmon and other delicacies, perfectly prepared. Here are four pans, each

No picture could be better to illustrate the "Battleship smartness" of Shippams' factory. It is a general view of the pastes cooking department.

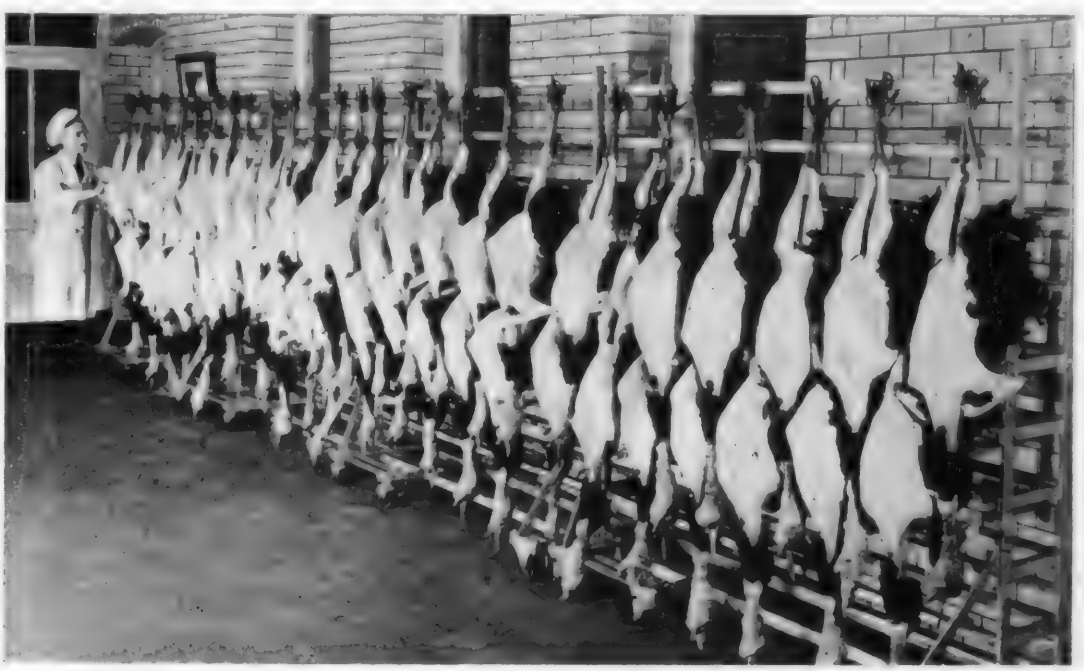
This picture of the factory shows its pleasant surroundings. On the right can be seen the old city walls of Chichester.

with 100 large chickens a-cooking, with a rack on top to keep them under the surface of the cooking liquor. But the rack is lifted off for us to see—*oculis subjecta fidelibus*.

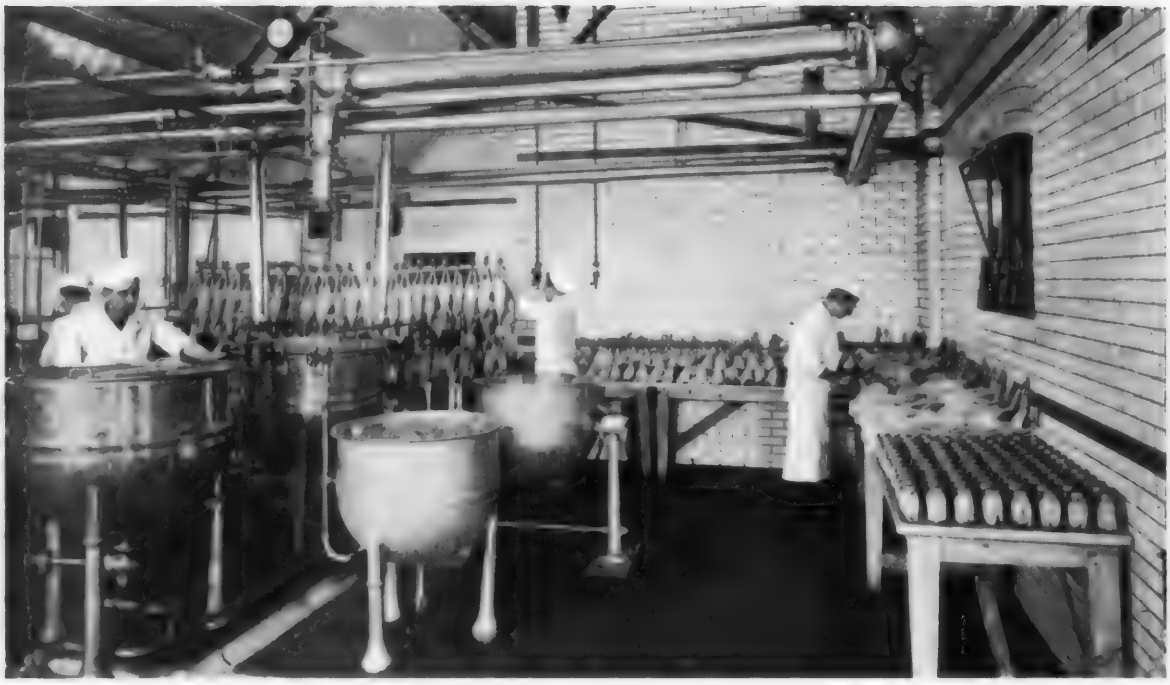
Pastes—and Pastes

Everybody knows there are pastes—and pastes. Shippams would be the last people to deny credit to others; but they do insist that if genuine and fresh materials, meticulous preparation and scientifically controlled methods from start to finish count for anything, then theirs could not be better.

We look carefully at the various materials, prepared separately for each product. Fowls, pheasants, ducks, turkeys, York hams and gammons, lobsters, shrimps, salmon, kippers and bloaters—all ready to go into the pot.



The fine birds on the right are some of the turkeys used for the turkey and tongue pastes.



The picture above shows a section of the factory where some of Shippams' finest products are made. It is the chicken breasts and chicken jelly department.

We wander into the different refrigerating rooms—at various temperatures. After being mixed and minced, the paste material is given a short chill, after which the glass pots are filled by hydro-electric machines.

Washing Machine

Here a word must be given to the pot-washing machine. The empty pots are carried into the machine on a belt; arrive at a point where brushes automatically enter them and twist round. Travelling round, the pots, being inverted on their way from the brushes, receive jets of detergent solution and two subsequent rinses with water. Result: an absolutely immaculate container.

The paste, having been filled into the pots, is covered with a disc of parchment paper and the rubber sealed caps placed into position. Travelling along stainless steel tables, the pots are sealed and are then ready for sterilisation.

Below is shown just a few of the pheasants used for Shippams' pheasant paste.

The Retort Room

The retort room, like all the others, is lined with white glazed bricks. Along one side, opposite the retorts, are a number of control instruments which regulate the time and temperature of sterilisation. The charts, with long ink lines, without a kink, along the correct temperature line, are evidence of the efficient working of this control system.

The impression, previously gained, of the large output is enhanced by the spectacle of the battery of labelling machines working at top speed. The machines are semi-automatic, but the men working them never miss a stroke.

Packing

The products are packed in wooden cases, the lids of which are nailed with twelve nails in one operation. From the nailing department the boxes are conveyed to the vans below by a door through which not only is a flow of full boxes, but a stream of empty boxes and other requisites going up.

Shippams make 33 varieties of meat and fish pastes. They also have other products of which they are legitimately proud. One of these is chicken breasts in jelly. Another is chicken jelly—a *de luxe* product mainly for the use of invalids and children.

A famous product is beef tea. The recipe used is one supplied to Shippams by Queen Victoria's chef, who had doubtless tried it out on the Royal Family.

Tongues and Sausages

There is a separate department which handles ox tongues in glass, and another where the famous "Chichester Brand" sausages are made; here a new air-conditioned drying tunnel was in course of erection.

Visitors are always welcome to go round Shippams' factory. No appointment is necessary, and each year many thousands avail themselves of the opportunity.

Before sterilising, the meat and fish pastes are hermetically sealed as shown in the picture on the right.

Below is a room in the separate department which handles the tongues and sausages. Here they are packing ox tongues into glass moulds.

Above is a battery of labelling machines and below is one of "the last scenes of all," the operators nailing and wiring up the boxes of Shippam products prior to dispatch.

The Social Side

A well-equipped social club has been provided for the staff, and is run by them. They also have cricket and football clubs, and a horticultural society. There is an employee benefit fund provided and controlled by the company, and there is a profit-sharing scheme in operation.

We talked to two members of the Shippam family. Their enthusiasm and deep interest in every detail of the concern and for the welfare of their employees left us in no doubt of the fact that the business was in good hands—a business that is in many ways a unique one.

SOME SUPPLIERS TO C. SHIPPAM, LTD.

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Caps and Capping Machines: *Wallis Tin Stamping Co., Ltd.,* 91, *Regent Street, W.* 1.

Control Instruments: *Cambridge Instrument Co., Ltd.,* 13, *Grosvenor Place, S.W.* 1; *Negretti and Zambra,* 38, *Holborn Viaduct, E.C.* 1; *Short and Mason, Ltd., Aneroid Works, E.* 17.

Conveyors: *W. and C. Pantin, Ltd.,* 147, *Upper Thames Street, E.C.* 4.

Electric Motors: *Crompton Parkinson, Ltd., Bush House, Aldwych, W.C.* 2.

Filling Machinery: *J. C. Wetter and Co., Ltd.,* 23, *Middle Street, West Smithfield, E.C.* 1.

Glassware: *Rockware Glass Syndicate, Ltd.,* 142, *Audrey House, Ely Place, E.C.* 1.

Jar Washing: *British Hydro Miller Co., Ltd., Slough, Bucks.*

Mixer: *The Morton Machine Company, Wishaw, Scotland.*

Nailing Machines: *Matthew Wylie and Co., Ltd.,* 71, *Milnpark Street, Glasgow, S.* 1.

Refrigeration Plant: *L. Sterne and Co., Ltd.,* 158, *North Woodside Road, Crown Ironworks, Glasgow.*

Steam Traps: *Walker Crosweller and Co., Ltd., Cheltenham, Glos.*

Wire Tying Machines: *F. A. Power and Sons, Ltd., Midland Wire Mills, Saltley, Birmingham.*

Book Reviews

A Survey of Meat Consumption

Some interesting contrasts in consumption are shown in the Imperial Economic Committee's Survey of the Production and Trade in Meat. In New Zealand, Australia and Argentina the people eat well over 200 lb. per head per annum, chiefly beef in the last named and both beef and mutton in the first two. In Great Britain, the United States and Canada the *per caput* consumption averages about 140 lb. per annum, of which pork accounts for about half, on average, and beef for most of the remainder in the case of the United States and Canada, while in Great Britain beef accounts for about 65 lb., pork for 45 lb. and mutton for 30 lb. In Germany and France very little mutton is eaten, about 1½ and 5 lb. respectively, but in Germany the consumption of pig meat is about 75 lb. and beef about 38 lb., while in France they consume 35 lb. of pig meat and 48 lb. of beef per head per annum.

From 1930 to 1932, the three years of deepest depression in trade, there was a shift in demand from beef to mutton and pig meat; it was not very striking, but none the less remarkable, since beef is the cheapest of the three.

Beef and Veal.—Our total consumption of beef and veal in 1936, the last year for which figures are available, was 28½ million cwt. Home production and imports both decreased from 1925 to 1932, but from that point, while imports have remained fairly constant, home production has shown a steady increase and now accounts for 49 per cent. in 1932. In the period (1930 to 1936) under review there was a shift in the relative importance of the three categories—fresh, frozen and chilled. Our consumption of fresh and frozen beef increased at the expense of chilled beef, but during the last two years or so the tendency has been reversed. The Empire countries supplied 23 per cent. of the total beef imports in 1936 as against 10 per cent. in 1930. The prices of all varieties have followed the world trend for all kinds of agricultural produce—that is to say, prices were fairly steady to 1931, then rapidly declined, and are only now reaching pre-slump level.

Mutton and Lamb.—We consume over 12½ million cwt. of mutton and lamb in a year, a figure which has remained remarkably constant and is by far the largest total in the world. In the United States the percentage of lambs slaughtered is extremely high, but whereas the total consumption of mutton is between 6 lb. per head, in Great Britain it is 30 lb. per head. The growing demand for "baby meat" is still pronounced. Between 1930 and 1936 the proportion of lamb to mutton imported increased from 62 per cent. to 79 per cent. In the same period the home supply has increased by about ½ million cwt.

Prices of fresh mutton fell more rapidly than beef during the depression years, but responded more readily to the restriction schemes of 1932. The prices of frozen mutton followed the world trend.

Pig Meat.—The United States is by far the greatest producer of pig meat, but production has declined very heavily since 1934 and was accentuated by the drought of 1935. In Great Britain, home production has shown a very substantial increase of nearly 4 million cwt. to over 9½ million cwt. between 1930 and 1936. In the decade to 1936 the proportion of home to imported pig meat has risen from 37·5 to 52·3 per cent., while consumption has risen from 38·1 to 43·7 lb. per head.

Home production of bacon and ham has shown a steady increase, and is now about one-third of our total consumption. Total imports have fallen steadily since 1932, though the share of the Empire countries has increased almost fourfold, from about ½ million cwt. to nearly 2 million cwt. The decline in our imports from Denmark has been 50 per cent. since 1932.

Prices of bacon and ham fell heavily during the slump, but showed a considerable improvement after the restriction of imports was arranged in November, 1932.

The past seven years has shown a very considerable growth in our imports of frozen pork from Australia and New Zealand, these countries accounting for over 80 per cent. of the supply.

Canned Meat.—Canning is one of the older methods of preserving meat, and with the restriction of imports of beef in carcase in the chief markets, the great grazing countries of South America have been canning a larger proportion of their output. But even in this trade restrictions have appeared, and we in this country have a 20 per cent. *ad valorem* duty on all canned meat except tongues, sweetbreads and jellied veal, the duty on which is 10 per cent. *ad valorem*. Voluntary agreements have been reached with the exporting countries to limit our imports to the level of 1933.

Our imports are fairly steady around 1·3 million cwt. a year, of which Argentina supplies half. The Empire share is very small—110,000 cwt.—though this is double the 1930 figure. In all, the United Kingdom receives about 60 per cent. of the world exports of canned meat, with the United States second with about half our amount.

A. McN.

The Factories Act, 1937

The words "Factories Act" frequently cause manufacturers and employers of labour generally a certain amount of trepidation, sometimes grave worry, mainly because these know vaguely of the existence of an Act which, in some mysterious way, controls their activities and limits their scope, but are not cognisant of the essential details of procedure nor aware of the penalties involved by the neglect thereof.

Recently a new Act has been put into being to consolidate the Act of 1901 and the numerous supplementary Acts passed from 1901 to 1929. This was necessary, because it brings out-of-date legislation into line with modern industrial methods and practice. There are many fresh provisions in the new Act bearing on the health and safety of industrial workers which, if properly understood and faithfully administered, should ultimately be of great benefit to all concerned. It is essential, therefore, that anyone who employs labour of any description should be fully acquainted with the fundamental provisions of the Factories Act in general, and of the additions and amendments of the 1937 Act in particular.

It is very difficult for the man in the street to plough a straight furrow through the varying fields of legal terminology, and in the end reap the satisfactory harvest of having done the right thing at the right time. It is, therefore, of primary importance for all concerned to have available a sort of concordance whereby the letter of the law may be interpreted in words understandable to the lay mind. Such a work has been undertaken by Mr. Leslie Maddock, well qualified to deal with the problem, being at the same time a barrister and author of books relating to the Housing Act of 1935 and various aspects of the Company Laws. He has had the helpful assistance of Sir Gerald Bellhouse, C.B.E., most of whose life has been spent in the administration of the Factories Act, and such a combination was bound to produce a most valuable and even standard work of reference on the subject. In a foreword Sir Gerald says: "But in a comprehensive Act of this kind guidance is needed both by those who administer it and by those who have to obey it. The author, with whom I have had the pleasure of collaborating in a purely advisory capacity, is to be congratulated on having produced a book where such guidance can readily be found." This statement completely epitomises the work in general, and it is only proposed in this review to indicate a few portions of immediate interest to food manufacturers.

(*Continued on page 242.*)

AN OLD-FASHIONED ABATTOIR

H. G. Lawson Johnston, who has had long experience in South America and the U.S.A. on these matters, reviews certain aspects of centralised slaughtering and describes the working of———————

WITH THE passing of the Livestock Industries Bill and the formation of a Government Advisory Committee in connection therewith, which at present has under consideration the applications from many Corporations for the erection of factory abattoirs (of which it is understood three are to be selected in certain regions), it does not altogether mean the passing of the private slaughter-house, of which there are several thousands in this country. But it is the first real attempt at the centralised slaughtering which has been practised for so many years abroad, especially in the United States.

The New Scheme

The present Government scheme means the commencement of an entirely new system of slaughtering animals as against the old methods adopted for many generations—namely, the private slaughter-house and the butchers killing and dressing their own beasts in the public abattoir.

The first and most important point in centralised slaughtering is the question of veterinary inspection. Under the new system a permanent veterinary inspector is on the spot, so as to ensure constant inspection of every beast that is put through the abattoir. All animals under suspicion are transferred at once to a special rail, and if finally condemned sent immediately to the destruction plant, which is detached from the main abattoir.

On the slaughter floor expert gangs speed up the operations, such as flaying, extracting the offals, dressing and washing the carcases. The blood, a valuable by-product, is carried to tanks for treatment. Water is supplied to wash down the floors thoroughly and keep them in first-class order; steam is generated on a more economical basis.

Where a multiple floor system is erected the site required for erection is less, the handling of meat and by-products by gravity is more economical and less trucking is required, owing to the system of chutes for hides, offals and by-products, each being despatched to their respective departments. Unnecessary duplication of machinery is avoided and the by-products are handled in bulk.

Production Costs

The greater the kill the less the production costs, as is shown by the high standard of efficiency now ruling in the North American packing-houses, where every by-product cost is worked out to the minimum. The cooling chambers are supervised by a refrigerating engineer, and kept at the required temperatures. A quick despatch is made to the local butchers' shops and meat presented to the housewives' tables, under Government inspection, with the greatest efficiency and hygiene fully worthy of the "Roast Beef of Old England." It is only then up to the farmers to see that the quality of beasts supplied to the abattoir is what the public seeks and demands.

Taking as an example the substitution of a small abattoir, say, for six private slaughter-houses, the advantages might be summarised as follows:

1. The rent, rates and taxes on six private slaughter-houses would be much greater than those on the abattoir.
2. Water heating in one boiler instead of six.
3. The cleaning down, repairs and upkeep of one establishment instead of six.
4. The lighting would be considerably cheaper.
5. One central refrigeration plant and cooler instead of six small ones.
6. One inspector required for the abattoir.
7. A staff of four to six butchers required for the abattoir.
8. A central deposit for hides.
9. A central melting plant for dripping, tallow fats. All guts, tripes treated in one place.
10. A central lairage, pens, etc.
11. In general, a speeding-up of slaughtering operations.

Chesterfield Abattoir. Architect: E. G. Felgate, Esq., A.R.I.B.A. This and the picture opposite by courtesy of Lockerbie and Wilkinson, Ltd.

A MODERN FACTORY ABATTOIR

Modern Methods

In most industries the question of modernisation in the erection of up-to-date plants has benefited the conditions under which labour works, and has speeded up production and put system into operation.

In the modern factory abattoir or meat works to-day, beasts for slaughter on arrival are placed in lairages, which are of an adequate size to hold a number of beasts to be slaughtered. The lairages are kept in a highly sanitary condition. Naturally, the nerves of the animals are somewhat shaken through being removed from their usual surroundings and, in the lairages, they are able to rest and regain part of their normal condition, which is most important before slaughter.

The animals either enter the stunning pen by a ramp leading up to the slaughter floor, or are stunned on the ground floor and hoisted to the killing floor out of sight of the other beasts. Stunning is done either with a captive bolt pistol or a blunt-headed hammer. Having been stunned, the beast is automatically thrown out of the stunning box by the slaughterman operating a mechanism which raises one of its sides and tilts its floor, thus ejecting the animal. Shackles are placed around the hind legs and it remains suspended head downwards from a rail along which it is conducted to the sticking point.

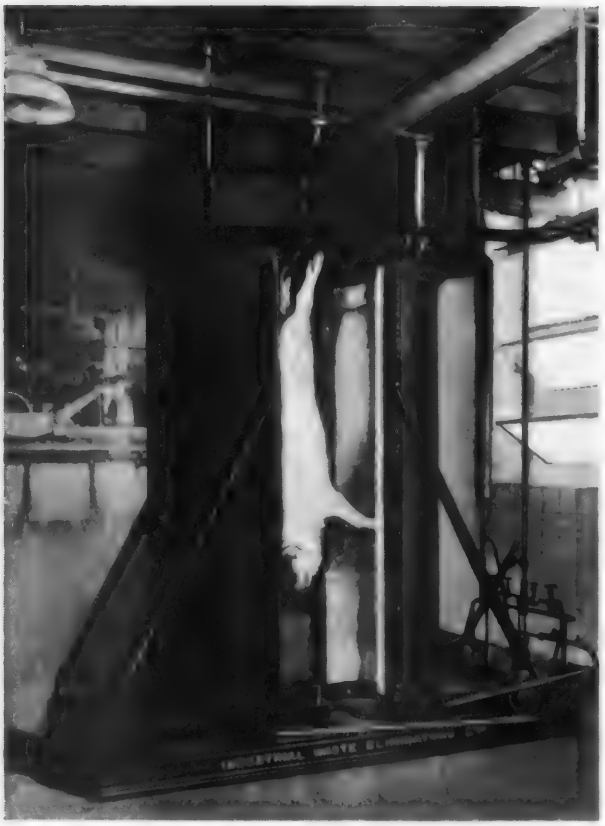
Bleeding

The neck and thorax are opened and the blood runs into the blood drain.

From the sticking rail the animals are pushed along the overhead rail to one of their respective killing beds, where they are lowered on their backs. The body is opened up and the hide skinned from the sides and legs. The cattle are again raised to the rail above the slaughter floor, where the rest of the de-hiding is done and the head and the entrails removed. In some abattoirs the head is removed at a point where the animal is bled, and a corresponding number is fixed both on the head and the carcase, in order to preserve the identity in case disease is discovered. The heads are placed upon a truck and inspected by a Government inspector. The carcases are then pushed along the overhead rail to the dressing bed (Pritch Plates), preparatory to de-hiding. The hide is then opened and the trachea detached from other tissues in the neck. The hide is removed from the lower part of the legs, sides, flanks, shoulder and shanks, and the sawing of the briskets and cutting of the aitch-bone takes place.

Cows

Where cows are concerned, the hide is partially removed, leaving a small portion on the udder, thus preventing any contamination should the udder be touched; the udder is then entirely removed. The carcase is half-hoisted in order to remove the hide from the hind shanks; in the same position, the hide is removed from the rumps and tails. The carcase is further raised in order to remove the hide from the hips, and is hoisted from the floor to the overhead track to enable the removal of the hide from the back, neck and front shanks.



A pig-singeing furnace in a bacon factory. This and the picture opposite by courtesy of Industrial Waste Eliminators, Ltd.

Inspection of hides for cuts, etc., is next made. The viscera are put into specially shaped trucks prior to inspection by the Government inspectors. The disembowelment of the animal is the next operation.

All suspected carcases are shunted on to a special rail. There is a final examination of retained carcases. Those which are condemned are sent at once to the destruction plant.

As the carcase travels along the conveyor the rumps are sawn, the loins are split, chucks and necks, dressing ("scribing") and the pounding down of the fine bones, removing the tails and trimming are carried out. The carcases then pass through a spray; at the same time, cloths are inserted into the large blood-vessels to prevent dripping; the fore-quarters are washed with a hard brush through which water runs and the surface of the carcase is then wiped with warm cloths. The examination of exposed surfaces takes place and the sides branded, marked and passed, and either passed into the cooler or hanging room prior to removal.

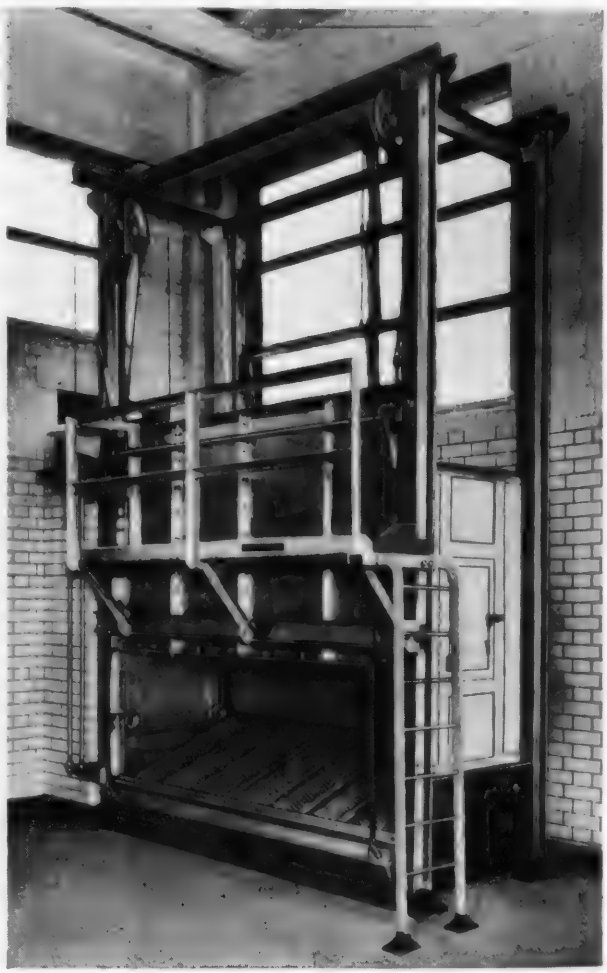
Sheep

Sheep are generally killed by severing the large blood-vessels in the neck with a sharp knife and bled while hanging from an overhead rail. Skinning of the hind legs then takes place. The sheep are transferred from shackles to a moving conveyor. While the two hind legs are held by hooks the front legs are held suspended by a spreader and are skinned. In the same position the briskets are skinned. The front legs are dropped and the sheep remains hanging by the hind legs. In this position the skinning of the flanks and rumps takes place. The skins are pulled from the carcase by hand. The briskets are opened and the caul fat removed. The viscera is removed for inspection, the heads removed and a spreader inserted in the brisket. The dressed carcase is then ready for the cooler or hanging room.

Pigs

Pigs are first stunned by an electrical stunner; shackles are placed around the near hind leg and they are hoisted mechanically to the sticking rail, where they remain during the period of bleeding, which is generally five to eight minutes. They are then pushed along the overhead rail to a lowering shield and lowered into a scalding tank for about three minutes in order to loosen the bristles. They are lifted from the tank by a lever ejector and pass through the de-hairing machine. Gambrels are inserted between the hind feet and the pigs hoisted mechanically to an overhead rail and passed through a singeing stove. Scraping is the next operation. Prior to opening up the brisket, the heads are partially severed and the carcase is opened. Before disembowelling, the examination of the exposed carcase takes place. Super-

A stunning pan.



A hanging or cooling hall with Mono-Rail Overhead runways.

(This and picture on next page courtesy Brook and Crowther, Ltd.)

By-products plant of Durban Municipal abattoir. On right is shown a Dry-rendering machine, on the left a blood-drier, at the back is a fat-settling tank mounted on a platform with a centrifugal fat extractor at the side. The plant was supplied by William Douglas and Sons, Ltd.

fluous fat is removed from the face and hams and leaf lard removed. The viscera are removed and placed on a conveyor table for inspection. Final examination of the retained pigs takes place; the carcases are then split in halves and the dressed carcases sent to the cooler or to the hanging room.

Chutes

Through a complete system of chutes the hides from the slaughter floor, offals, guts, horns, hoofs, fats, etc., are conveyed to the floors below to their respective departments for treatment.

Gang System

With the gang system of working in the slaughter floor, each man becomes an expert at his own particular job; the de-hiding, dressing, disembowelling, etc., are speeded up.

Washing Down

The slaughter floor is washed carefully after every day's kill, the water being supplied through two main pipes, one for cold water and the other for steam. The steam is passed into the cold-water pipe from this main pipe, and hoses are supplied at intervals.

A pig abattoir showing stunning pen, hand-operated live pig hoist, round bar skid bleeding rail, pendant-operated pig dropper over scaling tank, wall type dressing hoist, twin rail overhead runways, offal rails, etc.

A perfect system of drainage is most important. The blood from the killing floor is conveyed to the blood deposit tank for treatment. Green manure is either washed down the main drain or a central deposit store to be dried and sold as fertiliser.

Cold Storage

The control of temperatures and knowledge of refrigeration have to-day reached such high standards that the public may have full confidence in both chilled and frozen meat. In fact, in the United States most of the meat consumed has been held in chilled chambers for 48 hours. Surely it is economical for the butcher to regulate his supply and demand with safety, especially during the warmer weather. In some modern meat works a central control room is established where the temperature of each chamber is registered, which ensures uniform temperatures, thus obviating the necessity for visiting each chamber to inspect it. During the past few years a system of lockers has been started in the United States; there are the butchers', farmers' and private lockers. The meat is cut as desired and placed in these lockers until required. This system is no longer an experiment, and many thousands are in use.

By-Products

It is a well-known axiom in the meat trade that the higher the kill the greater the economy in the handling of by-products, and, with modern equipment, a high, standard article can be turned out under the supervision of by-products experts—*e.g.*, in the production of animal glands. In an up-to-date by-products plant treatment takes place of the following:

Beef casings, sheep casings, pig casings, technical tallow, meat meal, blood meal and blood fertiliser, sinews and hoofs.

It is most important in the treatment of fats for the manufacture of oleo oil, stearine and tallow that all the above should be kept clean and rendered as quickly as possible, otherwise the quality will not be kept up to the standard; therefore, with the by-products plant on the spot, such as it would be, instead of a delay in collecting the same, a first-class article should be turned out.

Machinery and Equipment

The following machinery and equipment are used in a factory abattoir:

Weighing machines, automatic stunning box, shackle chains, cattle hoists, spirals or chain pig hoists, overhead rails, offal trolleys, paunch trucks, beef droppers, rump-bone saws, beef scribing saws, combination rump-bone saw and carcase splitter, cosher chuck saws, hoof pullers, sheep racks, beef spreaders, pig scalding tank, pig singeing stove and pig de-hairing machine, hide flaying machine, horn saw, head splitting machines, conveyor tables.

By-products Department: Tripe washing machines, gut cleaning machines, blood treatment plant, tallow treatment plant, offal washers, refrigerating plant and other smaller equipment.

Acknowledgments are made to certain references from Allbright-Nell publications.

L. H. Hartland-Swann, C.B.E., on Sausages

When Mr. L. H. Hartland-Swann, C.B.E., a director of Lever Bros., and Unilever, Ltd., gave an address at Warrington a few days ago he alluded to the firm's interest in meat and meat products, of which they sold about 48,000 tons a year. "I don't know whether in this part of the world you know much about our sausages", he added. "Apparently in the north they like them spicy and strong, while in the south they like them milder, but taking our trade in England, as well as the great Dutch business, we put out the enormous quantity of 48,000 tons of meat and sausages every year.

"Then there is the canned goods trade. There is a lot said about canned goods, which is one of the safest of all kinds of food. The percentage of danger from any cause is about one-thousandth part compared with uncooked and uncanned food. Our canned food trade turns out something like 55,000 tons, equal to about £4,000,000 sterling turnover."

MEAT CANNING PROGRESSES

T. Crosbie-Walsh, F.I.C.

SOME OF the hottest news on meat canning comes from the American Canning Convention of 1938. In his paper "Meat Canning Goes Ahead", Paul I. Aldrich makes some interesting general remarks. He visualises the time when every household will have canned meats as the most important item on their canned goods shelf. He rather minimises the "convenience factor" in favour of: (1) Improved general quality of canned meat products; (2) improvements in containers and labels; (3) better advertising and merchandising. All these are vital factors, but the key to the situation will be found in the product itself. A few meat canners have been aggressive merchandisers, but too many have left to retailers the major task of selling their products. Without consumer demand, the meat canner has been at the mercy of most of the ill winds which blow in the food industry. Mr. Aldrich goes on to say that whether we like to admit it or not, it is a fact that there still exists a prejudice against canned meats among many housewives. The opportunities for increasing volume by consumer education are worth considering.

We have talked about the same things where our own canners do congregate and we are getting on slowly, but progress might well be greater.

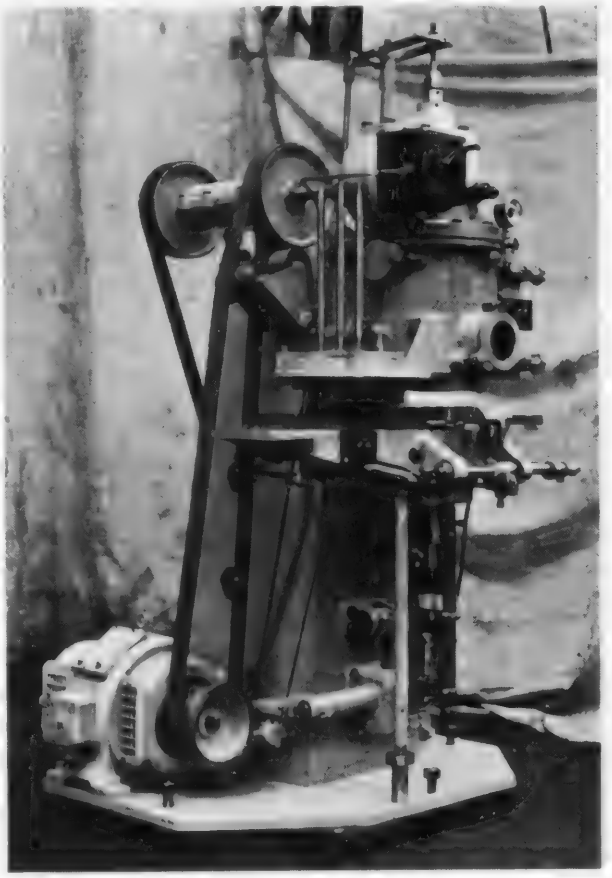
Mr. Aldrich stressed the difference between the points of view of the housewife and the canner. The former is interested in "eatability" solely, while the latter is preoccupied with his processing problems. He mentioned some successful new products. Judging from the rather conventional selection of canned meats offered for sale in this country, this point might well be considered.

The Imaginative Canner

Surely there is a large field for the imaginative canner? And yet one could count the readily available meat packs on the fingers of both hands. Pitching a few vegetables haphazardly into a can with pieces of meat and calling it a new pack won't do. British canners have improved in technique and they are to-day second to none in this respect, but they are conservative.

Not so long ago an enterprising canner put up canned rice pudding! And it is selling well. Of all the easy things to make possibly rice pudding is the easiest, and several people, when they heard of the idea of canning it, laughed it to scorn. Well, that's an example which may hearten the pioneer of "new" packs.

Have many canners thought of the "one-meal" can? That is, a little can containing just enough for one person. We have been hearing a lot about the lonely suburban wife lately. The eating habits of the female of the species when alone have long been proverbial. The one-meal



An instance of meat canning progress—a modern, fully automatic vacuum seamer, one of a range made by Ashworth and Parker, Ltd.

can would be a boon to her, whether she be housewife or bachelor girl.

There are no difficulties confronting canners who are anxious to "try out" such packs. The cost of an extra chuck for their double seamer is almost negligible. The can makers will supply the necessary cans in quantities sufficient to place trial consignments on the market.

Exhausters *v.* Vacuum Closers

There appear to be two definite schools of thought in the canning industry regarding the production of the vacuum in a can. Like everything else under the sun, circumstances alter cases, and it is dangerous to generalise. It is probable that the canning industry in this country, whether it be of fruit, vegetables or meat (with the exception of those old-standing firms who have been operating long before fruit canning was thought of in Britain), has followed the trend of fruit canning methods, in which the exhauster figured. One of the arguments for the exhauster is that it will work with different sized cans without any modification being required, whereas with the vacuum seamer "expensive" chucks are required. The "exhaust" advocates point to maintenance costs and possible breakdowns of the vacuum seamer. The vacuum-seaming fans cite cases where well-known canners working on a large scale have adopted the new method with great satisfaction and success, and point out that any piece of mechanism must be treated decently and that these machines are being progressively simplified and that in any case there is nothing about them which is beyond the understanding of an ordinary skilled mechanic.

The canner who is contemplating increasing his production or modifying his methods should be careful of special pleading and examine the matter carefully from all its angles. There is no such thing as a "standard" canning proposition. Every one must be examined on its own merits. In some cases it will be found that exhausters are the things to be used with best advantage, and in others the vacuum seamer. Cookery-book methods do not work in canning.

Cooling of Cans

Reverting to the work of the American Canning Convention, G. V. Hallman read a paper on "The Methods of Cooling Processed Cans of Meat". He said that great care is taken in regard to details of processing up to the time that the cans emerge from the retort, but it may be that not enough stress is laid upon the state of the cans after undergoing the sterilising operation. The general effect of cooking canned meats is that they develop a scorched flavour, a loss of flavour, a darker colour or a poor texture. As the temperatures used for sterilisation are well above cooking temperatures (150° to 212° F.), cooking of the product continues during cooling until the contents of the can have been cooled to approximately 150° F. The time of this cooking period, during cooling, depends upon the rate of cooling. This is affected by (1) the time elapsing between the end of the process and the start of the cooling procedure; (2) the rate of transmission of heat within the product itself; (3) the temperature of the cooling water; and (4) the amount and extent of the circulation of the cooling water.

At the completion of the cooling procedure the average temperature of the product should not exceed 105° F. The purpose of this is to prevent spoilage by obligate thermophilic bacteria. These bacteria grow in a temperature range of 110° to 160° F. They produce very heat-resistant spores, and a process which would destroy these spores would seriously damage the quality of the product. Since practical experience has shown that cooling to 105° F. will prevent this type of spoilage, this procedure is in general use. Thermophilic spoilage is most likely to occur in canned meats containing cereals.

A point raised by Dr. Hallman is that canned meats should not be cooled excessively. They should not be cooled below the dewpoint of the storage room. Excessive cooling may cause rusting of the cans.

Pressure Cooling

With some notable exceptions, "pressure cooling" has become a routine measure in this country. Dr. Hallman mentions that the abuse of this device may produce panelling of the sides and bodies of the cans. Some examples of this have been brought, during the past few years, to the attention of the present writer. Well-adjusted pressures will help greatly, but perhaps there is a tendency on the part of canners to rely unduly upon the effects of pressure cooling and to use insufficiently strong tinplate, especially for the larger sizes of packs. The canner of large meat packs—ofttimes of irregular shape—must rely upon cans which, in comparison with mass-produced ones, are practically hand-made. These cans are capable of resisting greater strains due to internal pressures. They are usually more heavily tinned in order to minimise sulphur staining.

It is possible to visualise the use of the weakest material were it possible to so adjust internal and external pressures that straining and consequent leaks or buckling were avoided. But the varying factors are too numerous. Apart from the pressure of steam generated in the can, there are other gases formed. No batch of meat cans would be likely to evolve the same amount of gas. No batch of cured meat comes out with the identical amount of nitrite, nor with the same degree of the degradation of the proteins. Hence, no undue reliance must be placed upon pressure cooling to the detriment of the quality of the can. These are not hypothetical considerations, as past *débâcles* in canning have demonstrated.

Chlorinated Cooling Water

Dr. Hallman gives some remarkable figures in connection with the difference between the cooling of cans in chlorinated and non-chlorinated water. He says that under conditions of good factory operations, plus good commercial seams, more spoilage resulted from cans cooled in water with a bacterial count ranging from 7,000 to 70,000 bacteria per c.c. than when the bacterial count was reduced by chlorination to 0 to 1 organism per c.c. In this experiment, approximately 50,000 cases of corn were cooled in chlorinated water. The following results were obtained:

Can Size.	Swelled Cans per 1,000. Chlorinated Cooling Water.	Non-chlorinated Cooling Water.
307 × 302	0·46	3·44
603 × 408	0·39	5·17
303 × 406	0·29	1·17
603 × 700	1·37	7·80

Additional experience has shown that a more marked reduction in spoilage may be obtained when cooling water of low bacterial count replaces grossly contaminated water.

These figures are suggestive, especially to those canners who consider that the contents of cans are well and truly isolated from their outside influences from the moment they are sealed. The only reason why the use of non-chlorinated cooling water produces a greater number of leaks is that some cooling water enters the cans. This fact may go to explain losses, and is well worth the attention of canners who are using water of unknown bacterial content.

Maturing of Meat

Of interest to the cannery chemist are the results of experiments by I. A. Smorodintzev (*Ukr. biokhem. Zh.*, **9**, 791; *Chem. Abstr.*, 1937, **31**, 2696). The investigator finds that the maturing of meat is a process of transformation of active albuminoids of the muscular plasm into a coagulated substance, the greatest changes in total and amine nitrogen content being observed six hours after the death of the animal. Maturing took from 24 to 72 hours, depending on individual properties of meat and temperature of environment. Chemical indices which characterise matured meat are given in terms of lactic acid reducing substances, *p*H, and the ratios of amine nitrogen to reducing substances, of glycogen to lactic acid and of ammonia to total nitrogen.

J. S. Fernandes (*Boll. Minist. Agric.*, Rio de Janiero, **25**, 77; *Chem. Abstr.*, **31**, 5888) suggests that the degree of ripening may be determined by the "coefficient of maturing", which is the relation between amounts of ammoniacal nitrogen of the soluble albumin and of starch compounds and total nitrogen. He gives a formula for calculating the coefficient, and a Swiss method for determining the various forms of nitrogen in beef are included.

Most branches of science have taken a hand in the canning industry, but there is still a wide scope for further work. Canners may deem themselves fortunate in the many investigators who are engaged in their problems in every country in the world.

ARMY RATIONS

ONE OF the many remarkable strides which the canning industry has made of late years has been the adoption of automatic pressure cookers in place of ordinary retorts. Sterilisation by automatic means has eliminated uncertainty and variation in all types of packs, be they meat or vegetables. Prior to the introduction of this comparatively new refinement, loads of hot canned product could be seen stacked up for varying times, awaiting their turn to go into the retorts. During this time cooking was proceeding, and as the time of waiting differed considerably each batch was different from the other.

Production Costs

One of the features of the automatic retort is that higher temperatures and shorter times have been adopted, with the result that output has been enabled to be increased and production costs reduced.

Another feature is the possibility of controlling within the smallest limits the exact time and temperature of sterilisation, by means of variable speed gears and temperature controls.

Immediately on leaving the seamer, each can enters the cooker at the higher temperature and continues in this for a predetermined period, after which it enters the cooler under pressure and is cooled and discharged into the atmosphere ready for the store.

The saving in steam consumption over the retorting system is definite. By efficient insulation losses due to radiation are practically eliminated. The discharge from the valves can be connected with the existing exhauster. Modifications in processing times and temperatures may be introduced (according to the size of can and the nature of the pack) by means of accessible speed and temperature controls.

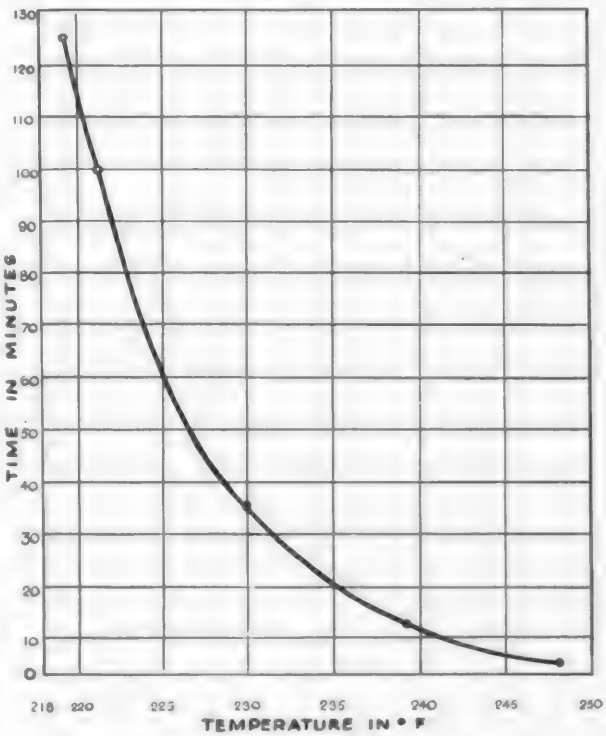


FIG. 1.—*Bacillus botulinus*, by Esty and Meyers.

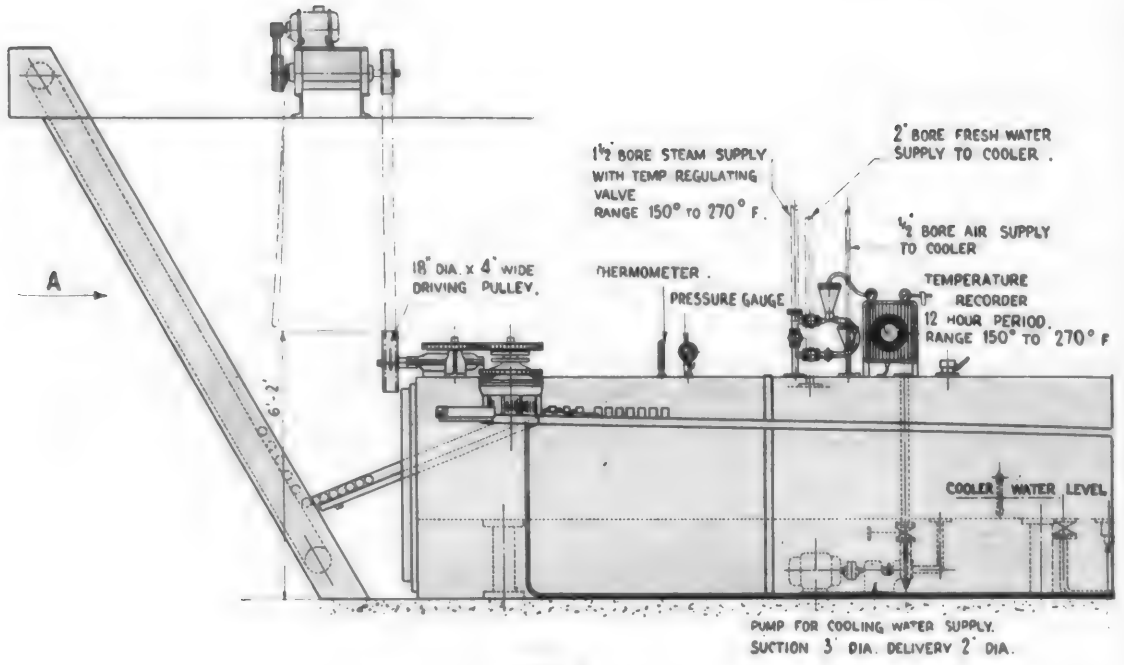

A
18" DIA. x 4" WIDE DRIVING PULLEY.
1½" BORE STEAM SUPPLY WITH TEMP REGULATING VALVE RANGE 150° TO 270° F.
2" BORE FRESH WATER SUPPLY TO COOLER.
½" BORE AIR SUPPLY TO COOLER
THERMOMETER.
PRESSURE GAUGE
TEMPERATURE RECORDER 12 HOUR PERIOD. RANGE 150° TO 270° F
COOLER WATER LEVEL
PUMP FOR COOLING WATER SUPPLY. SUCTION 3" DIA. DELIVERY 2" DIA.

FIG. 3.

Hit-or-Miss Methods

By continued research the process of sterilisation has been delivered from hit-or-miss methods. A good proportion of the troubles which canners have encountered in the past has been due to the difficulties of introducing scientific knowledge on a commercial basis. Much good stuff has been lost by insufficient and, it may be added, too much heat treatment in the sealed can.

In order to demonstrate the methods available to the canner to ensure the integrity of his product, one may take army rations as an example. Here are heterogeneous products, the specification of which may be of interest.

ABSTRACT FROM SPECIFICATION

MEAT AND VEGETABLE RATION

1. The ingredients used in the manufacture of the meat and vegetable ration to be of the best quality, properly cooked, and to be open to inspection before and during process of manufacture, and after canning.

2. The meat to be well fed, good, sound, sweet, and wholesome. The beef to be from the carcasses of cattle in prime condition, not under two nor over four years of age, and to be taken from the fore- or hind-quarter, but exclusive of neck, shin, hock, or thin flank. In the case of frozen or chilled beef, the meat must be imported as whole quarters or crops. The mutton to be from carcasses of mothers and ewes not more than four years of age and in prime condition, but exclusive of the neck, breast, and skirt. The meat to be well trimmed and to consist entirely of palatable, edible meat. No head meat, scrap meat, or cuttings to be used. All vegetables to be carefully cleaned. The rice to be unpolished and well washed.

3. (*a*) Rations described as "Meat and vegetable rations with fresh green peas*" to consist of (at least):

	Ozs.	
Meat (of which not more than 1 oz. is to be in the form of loose fat)	9	These weights apply to uncooked meat and vegetables.
Potatoes	5	
Carrots	1	
Fresh green peas	4½	
Onions	½	
Stock gravy, made from good beef stock	2	
Salt and spice	½	

* Dried peas may be offered when fresh peas are not in season. Contractor must state when tendering whether fresh or dried peas are offered.

(*b*) Rations described as "Meat and vegetable rations with potato" to consist of (at least):

	Ozs.	
Meat (of which not more than 1 oz. is to be in the form of loose fat)	9	These weights apply to uncooked meat and vegetables. Beans and potatoes to be soaked for at least 12 hours before adding to the other ingredients.
Potatoes	5	
Carrots	1	
Onions	½	
Haricot beans, or Butter beans, or Dried green peas (dry)	2	
Stock gravy, made from good beef stock	3	
Salt and spice	½	

(*c*) Rations described as "Meat and vegetable rations with rice" to consist of (at least):

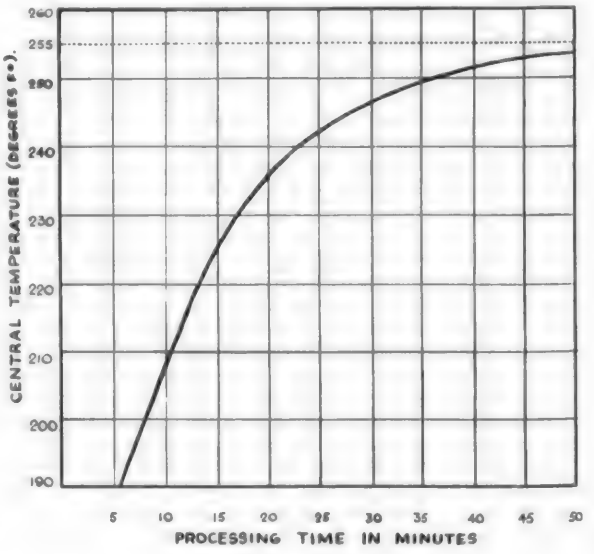
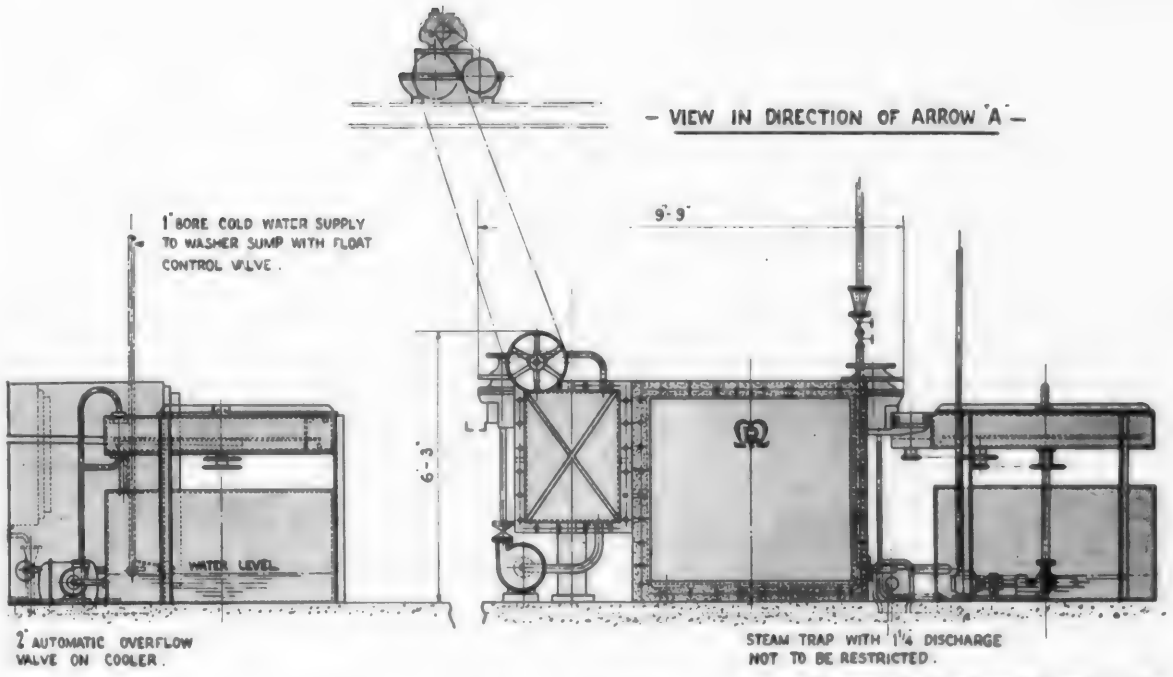


FIG. 2.—Heat penetration—A2½ cans.


– VIEW IN DIRECTION OF ARROW 'A' –
1" BORE COLD WATER SUPPLY TO WASHER SUMP WITH FLOAT CONTROL VALVE.
9'-9"
6'-3"
WATER LEVEL
2" AUTOMATIC OVERFLOW VALVE ON COOLER.
STEAM TRAP WITH 1¼ DISCHARGE NOT TO BE RESTRICTED.

[Courtesy, *Food Machinery (M. and P.), Ltd.*

FIG. 3. (Continued).

The arrangement of a cooker similar to that mentioned in the article.

	Ozs.	
Meat (of which not more than 1 oz. is to be in the form of loose fat)	9	These weights apply to uncooked meat, vegetables, and rice. Beans and peas to be soaked for at least 12 hours before adding to the other ingredients.
Rice, dry	1½	
Carrots	1	
Onions	½	
Haricot beans, or Butter beans, or Dried green peas dry	2	
Stock gravy, made from good beef stock	6½	
Salt and spice	½	

(*d*) Rations described as "Meat and vegetable rations with pudding" to consist of (at least):

	Ozs.	
Meat (of which not more than 1 oz. is to be in the form of loose fat)	9	These weights apply to uncooked meat, vegetables, and pudding. Beans and peas to be soaked for at least 12 hours before adding to the other ingredients.
Pudding (to be made from two parts by weight of wheat or oat flour, or mixture of these flours, and one part by weight of suet)	3	
Potatoes	2	
Haricot beans, or Butter beans, or Dried green peas dry	2	
Carrots	1	
Onions	½	
Stock gravy, made from good beef stock	4	
Salt and spice	½	

The amount of gravy to be increased in all cases as much as the size of the tin will allow.

The proportion of fat found on analysis of the ration should not be less than 4 per cent., and must not in any ration exceed 8 per cent.

No preservative to be used.

4. The rations will be rejected if, at any time during the warranty period, it is found they contain tin in excess of 1 gr. per lb. or lead in excess of 1 part in every 1,000,000.

5. The rations supplied to be in general accord with the sample approved by the Officer Commanding, Supply Reserve Depot, Deptford, London, S.E. 8.

In the old days a canner would have found out how to sterilise his product by "trying out" various times and temperatures. He would not have taken into account the periods over which the pack was awaiting its turn to go into the retort or any delay in the cooling operation after processing.

Later on he might have used maximum and, later still, distance thermometers. All quite helpful things, but, owing to the variable factors mentioned, the whole business was empirical.

Bacillus Botulinus

The procedure carried out in the Campden Research Station, in which was installed an automatic pressure cooker in 1934, is to base thermal death points on the *Bacillus botulinus*. These are graphed as in Fig. 1. It will be seen that *B. botulinus* is killed in 125 minutes at a temperature of 219° F., in 10 minutes at 235° F., and so on.

A heat penetration test is then carried out on the actual pack under investigation and the results are also graphed (Fig. 2). By means of the two graphs all the details necessary for processing are available, and, allowing a margin of safety, processing temperatures are selected according to the nature of the product. Times required for processing are read on the graph.

In connection with army rations, a cooker similar to that illustrated was employed, and some details of output are embodied in the following table:

Type No	Can size	Total holding capacity	OUTPUTS—IN CANS PER MINUTE											
			Cooking time in minutes											
			30	35	40	45	50	55	60	65	70	75	80	85	90
4	A1, E1 A1 tall	3130	94	80	78	69	62	57	52	48	44	42	40	37	35
	A2	2812	94	80	70	62	56	51	46	43	40	37	35	33	31
	A2½	2342	78	66	58	52	46	43	40	36	34	31	29	27	26
Cooling times in mins.			8·0	9·5	10·8	12·0	13·6	14·5	15·6	17·4	18·4	20·0	21·5	23·0	24·0
5	A1, E1 A1 tall	3710	92	92	92	82	74	67	62	57	52	49	46	43	40
	A2	3332	92	92	82	74	66	60	56	51	48	44	42	39	36
	A2½	2774	92	80	70	61	56	50	46	42	40	37	34	32	31
Cooling times in mins.			6·8	7·9	9·1	10·2	11·3	12·5	13·5	14·7	15·8	17·1	18·2	19·5	20·4

THE CURING OF MEAT

A study of recent progress in research

by

OSMAN JONES, F.I.C.

CONSIDERABLE RECENT progress has been made towards the elucidation of some of the hitherto obscure changes which take place as curing proceeds, and it would appear probable that in the not too distant future the whole complicated mechanism will be understood. When that stage has been reached there is little doubt that many of the existing ideas upon the subject will need modification and the present methods of curing changed.

It is the purpose of this article to summarise the latest published work and to indicate where possible how it may be applied in practice. Curing can be regarded as taking place in two stages, the first is the penetration of the pickle or curing agent into the meat, and the second the bringing about of those changes which convert fresh meat into cured meat. Obviously before the second reactions can operate the curing agent (*i.e.*, the pickle) must reach the regions where it can function.

Effect of Salt Solutions

In the report of the Food Investigation Board for the year 1934, Callow[1] sets forth in some detail the effect of salt solutions upon the muscular tissue of pigs and also describes the method by which the salt penetrates into the flesh. Since that date he has been conducting further studies into this aspect of curing and has found that salt penetration does not take place at the same rate into the flesh of all pigs, as was at one time believed. Quite possibly this is one of the reasons why uniformity of cure is so seldom attained. He explains that the rate of penetration is in some measure due to the electrical resistance of the muscle tissue and this effect may be so marked as to lead to tainted meat in those cases where the electrical resistance is exceptionally high. It has long been known, although an explanation has not been forthcoming, that poor results follow the killing of pigs which have been subjected to exercise shortly before slaughter. Where possible, it has been the practice in well-conducted bacon factories to give the pigs several hours' rest prior to slaughtering them, because by so doing a marked improvement in quality of the product is obtained, and the incidence of taint—a dead loss to the manufacturer—is greatly reduced.

Electrical Resistance

Callow, in investigating these well-known facts, found that the flesh of pigs killed upon the farm showed the lowest electrical resistance, those subjected to exercise the highest resistance, and the factory-killed pig, after rest, occupied an intermediate position. The figures he quotes are:

Average resistance of farm-killed pigs ..	234 ohms.
,, ,, ,, exercised pigs ..	469 ,,
,, ,, ,, factory pigs (after resting) ..	386 ,,

He also found that the effect of the pigs fighting with one another was to cause an increase in the electrical resistance. The effect of fighting would probably cause a decrease in the glycogen reserve of the carcase, which might have some influence upon the tenderness of the flesh (particularly in those cases where it was intended for sale as pork), and also cause an increase in the electrical resistance.

It has been ascertained that the flesh showing high electrical resistance has a higher *p*H value than that showing low electrical resistance, or in other words, the former contains less acid than the latter. Callow suggests that this factor contributes to the production of taint in flesh with high resistance, as putrefactive organisms grow better in neutral media.

In short, this recent investigation has shown that the liability for taint to occur in the flesh of pigs undergoing cure is intimately associated with the physical condition of the pig at the time of slaughter, which has a marked effect upon the electrical resistance of the flesh, this in turn affects the rate of the penetration of the pickle, and at the same time decreases the acidity, both of which factors encourage the growth of putrefactive bacteria.

Muscle Pigments

J. Brooks[2] has been investigating the changes in muscle pigments which take place during cure. It is, of course, now well known that the red colour of cured meat is due to the presence in it of nitrosohæmoglobin, produced by the action of nitrite upon hæmoglobin, but the exact mechanism of its production is not yet known. Under ordinary conditions of cure, both nitrosohæmoglobin and methæmoglobin are formed, due to the inability of the tissue to maintain a reducing condition. This has been proved to be the case because in the presence of a reducing agent—*e.g.*, sodium hydrosulphite, only the nitrosohæmoglobin is formed. It should be noted that methæmoglobin possesses a brownish colour. If, therefore, a method of curing could be found which em-

[1] Food Investigation Board *Report*, 1936, 75, 87, 89.

[2] Food Investigation Board *Report*, 1934, 67.

ployed, in addition to the usual ingredients of a pickle, a reducing agent, permissible under the existing food laws, a marked improvement would take place in the colour of cured meat both immediately after curing and for a longer period when exposed to the atmospheric influence. The reducing agent would prevent the formation of the methæmoglobin which impairs the colour of the cured meat. It has also been found that even in the absence of atmospheric oxygen some methæmoglobin is produced by the action of nitrite on hæmoglobin. The curing of meat *in vacuo* would not, therefore, overcome the difficulty.

Decomposition of Nitrosohæmoglobin

Study has also been devoted to the decomposition of nitrosohæmoglobin in the presence of oxygen, and it has been found that a solution of the nitroso compound slowly changes its colour from red to brown, owing to the formation of methæmoglobin. The change is the result of several reactions, the initial one being the decomposition of nitrosohæmoglobin into reduced hæmoglobin and nitric oxide. The final products are methæmoglobin and nitrate. All this work is of importance because it accounts for the change in colour of the cut surface of bacon. It is a generally accepted fact that when a cut surface of bacon is exposed to the air it changes colour and takes a brownish tint. Part of the change may be, and probably is, due to loss of moisture, but much of it can now be accounted for by the breaking down of the nitrosohæmoglobin into the methæmoglobin.

Two pieces of bacon cured in the same tank under strictly controlled conditions seldom show on equal rate of colour change of the cut surfaces, and it must be considered as possible for other factors to enter into the reaction which would cause a more rapid break up of the nitroso compound. The difference in the rate of colour change is even more marked in the flesh of different pigs. It is, therefore, obvious that more research is needed in this aspect of curing, and the suggestion is put forward that the amount of muscular hæmoglobin present in the flesh has a bearing upon the subject. The quantity of hæmoglobin in the flesh of different pigs, or even in parts of the same pig, shows great variation, and the cut surfaces of different parts of bacon from the same pig also show variation in the colour change too.

There is some evidence that hæmoglobin is more easily changed to methæmoglobin than is nitrosohæmoglobin, so that the greater the amount of the nitroso compound which can be formed during cure the less will be the tendency for the surface of the cured flesh to show rapid colour change.

Retention of Colour

There is another fact that requires elucidation—the retention of colour of bacon cut from a well-matured side is much more marked than from a side cured by the more modern immersion method which, of course, is of comparatively short duration. This may be due to the fact that during the longer period of cure in the case of the matured bacon more of the nitrosohæmoglobin has been formed. This thought raises the question of whether any change in methæmoglobin-nitrosohæmoglobin can take place under special conditions, such as reducing action. Although the retention of colour may not be of great scientific significance, it is nevertheless of great importance to the bacon trade, for the brown appearance shown after cutting detracts greatly from the sale value of the bacon exposed in the retailers' shops.

Sufficient has been said on this aspect of curing to indicate that unknown factors are still awaiting solution.

Another Aspect

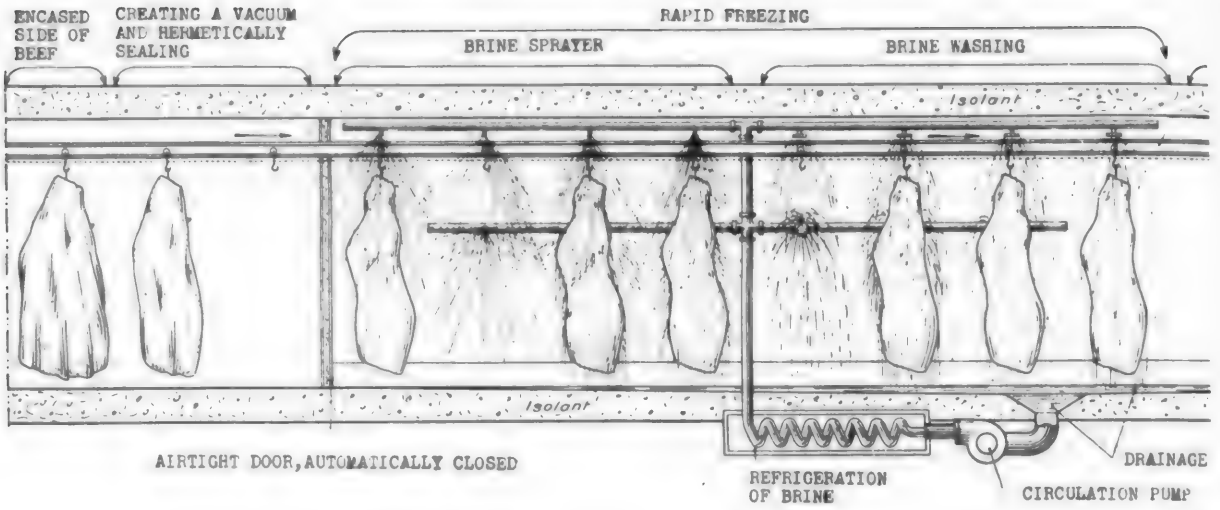
The third aspect of curing which has been receiving attention is that dealing with the tolerance of micro-organisms to salt solution. Ingram[3] has investigated the behaviour of three classes of organisms which he found in bacon slime, and has found that the micrococcus tolerating 20 per cent. sodium chloride solution is *M. subflavescens*, the bacillus tolerating 10 per cent. was a strain of *B. cereus*, while the pseudomonas, not tolerating 5 per cent. sodium chloride, had the characteristics of *Ps. fluorescens*. This latter organism is one of the more common putrefactive organisms.

The systematic examination of many hundreds of samples of curing pickles has shown that under normal conditions the micro flora consists almost entirely of micrococci of the nitrate reducing type, all of which, of course, are salt tolerant up to at least 20 per cent. strength. The fact must therefore be regarded as worthy of further investigation, and, according to Bergey,[4] *M. subflavescens* does not reduce nitrate. If this is so, however, why then should it invariably be swarming in and upon all bacon undergoing cure? If it is not the organism primarily responsible for nitrate reduction, it would seem that other strains of salt tolerant micrococci are responsible for that reaction. Here again is a field for research, for it should be possible to classify very definitely all bacteria which are salt tolerant in those strengths of solution in curing, and which bring about the reduction of nitrate to nitrite.

On the other hand, *B. cereus* (in the majority of strains) reduces nitrate, and furthermore, is definitely a putrefactive organism. The fact that it is found upon the slime formed on the surface of bacon, but seldom in the curing pickle, may be accounted for by the intolerance of the organism to more than 10 per cent. salt solution, for this strength of salt does not occur in the meat immersed in pickle of much greater strength. The possibility therefore arises that *B. cereus* may play a part in the nitrate reduction, but ultimately gets destroyed by its contact with stronger salt solution as the cure proceeds and more salt enters the flesh.

Until more light has been thrown upon the action of bacteria in the curing of meat, the complicated changes undergone cannot be fully explained, but there can be no doubt that when the final solution is obtained it will have an important bearing upon existing methods. It is not as yet possible to know whether the rate at which nitrate is reduced may not have an all-important bearing upon the change of colour in bacon brought about by the formation of methæmoglobin.

[3] Food Investigation Board *Report*, 1934, 77.
[4] Bergey, *Manual of Determinative Bacteriology*.



QUICK FREEZING

Specially Contributed

MORE INFORMATION is now available concerning the new system, called "Cryo-Vac," for preserving foodstuffs for long periods, particularly meat in carcasses. This system was mentioned in the December, 1937, issue of FOOD MANUFACTURE. It is a combination of quick freezing, storing and delivery to the consumer.

The Process

The process consists in placing the foodstuff in a special latex skin bag in which, after sealing, the air is withdrawn so as to make an artificial film, which is held in place by positive adhesion no matter how irregular is the surface of the product to be treated. The latex skin is thin, resilient, and strong enough to withstand normal handling; it is also water, air and acid proof.

Once coated, the foodstuff can be treated for quick freezing by the wet system by a low-temperature brine, liquid ammonia or alcohol, etc. Once frozen hard, it is kept in holding rooms at medium low temperature up to the time it is consumed. When thawing is effected by raising the temperature, all condensed water precipitates on the outside of the bag, leaving the product in exactly the same state as when it entered the bag. There occurs no loss in weight, shrinkage, change of colour or form, and the fat does not become rancid.

Enemy No. 1

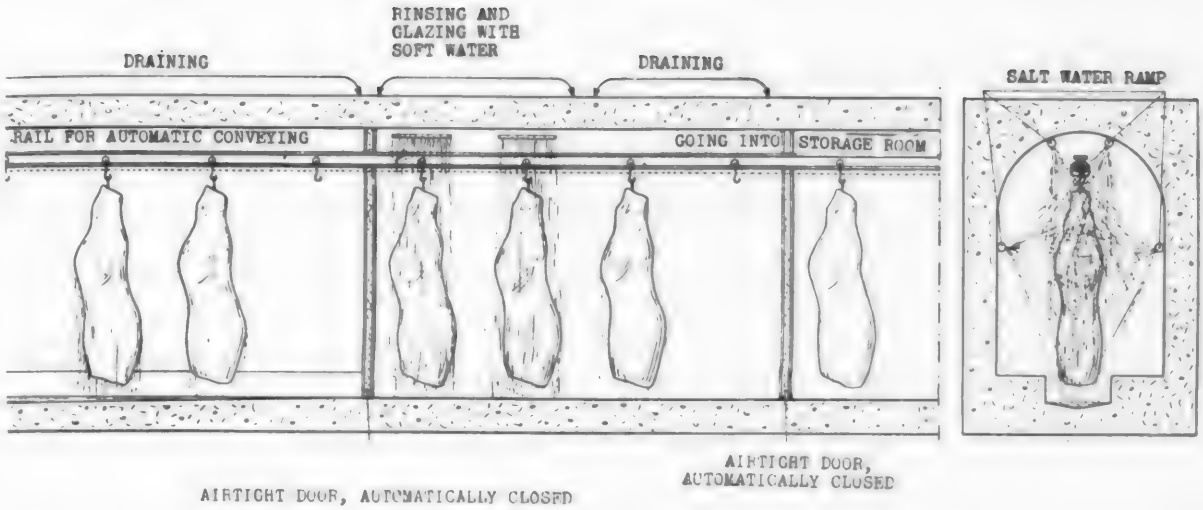
Apparently the inventor's intention has been to prevent any contact of the food with air, which he considers to be "Enemy No. 1." The permanent protecting wrapping of the food from the time of sealing to consumption ensures the absence of air as well as contamination from outside sources.

Rapidity of Freezing

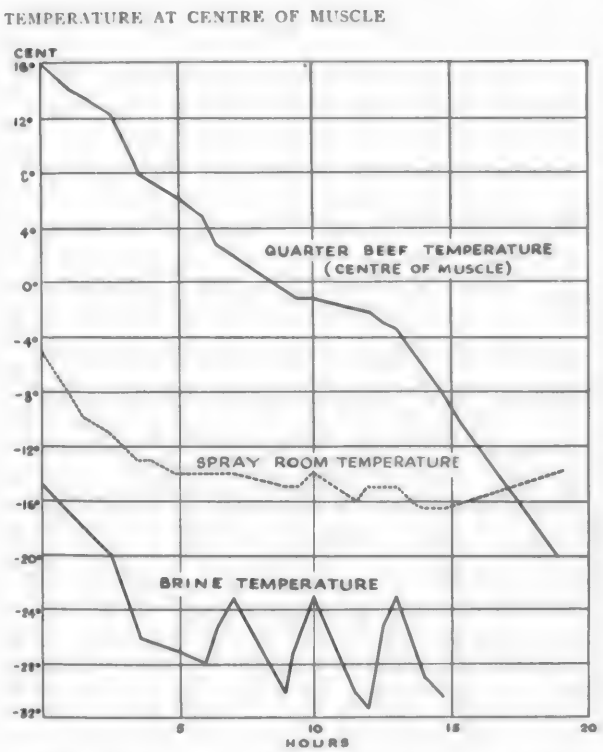
The "quick freezing," although indirect, may be compared with direct action by conduction owing to the perfect adhesion of the latex skin and the absence of air spaces between it and the foodstuff. A quick action is obtained either by brine shower or activated cooling media at low temperature. The rapidity of the action has been confirmed by actual tests by which a half-section of beef has been frozen in the centre of the muscle in 12 hours, compared with 72/80 hours with the usual cold air blast system. The brine was at $-25°$ C. and the freezing point in the meat $-14°$ C. Quicker freezing has been obtained by using dry CO_2 with an alcohol solution at $-76°$ C., and the time was 2 hours 48 minutes to obtain the aforenamed temperature in the centre of the meat.

Stabilisation

It is a well-recognised fact that the quicker a product is frozen the more it is stabilised to its highest point of stabilisation. The system under review may be used with low temperature liquids, and takes advantage of sealing the blood cells before separation starts. Meat immediately after killing—*i.e.*, before it has lost its "animal heat"—has been treated and stored for three months, after which time no shrinkage or loss of weight had been incurred, which in the case of meat frozen by



QUARTERS OF BEEF



THE COOLING CURVE OF A QUARTER OF BEEF
Weight 55½ Kilos.

NOTE.—**The brine temperature is not even owing to the compressor being too powerful and having to be stopped at intervals. This had an effect on the freezing curve.**

ordinary methods is not possible. One particular point is that the meat cannot be distinguished from freshly killed meat and the "bloom" is perfect.

Application to Fish . . .

The Cryo-Vac system has also been applied to fish, poultry, dairy products, medical glands, etc. In a particular case it has been used to keep bread which after thirty days could be compared with bread two days old.

. . . Meat, Vegetables, Fruit

These are some of the possible applications, and in America it will be used shortly on small cuts of meat, such as steak, cutlets, prime beef, etc., and filleted fish. The system is also used for vegetables and fruit.

Employment in Existing Plants

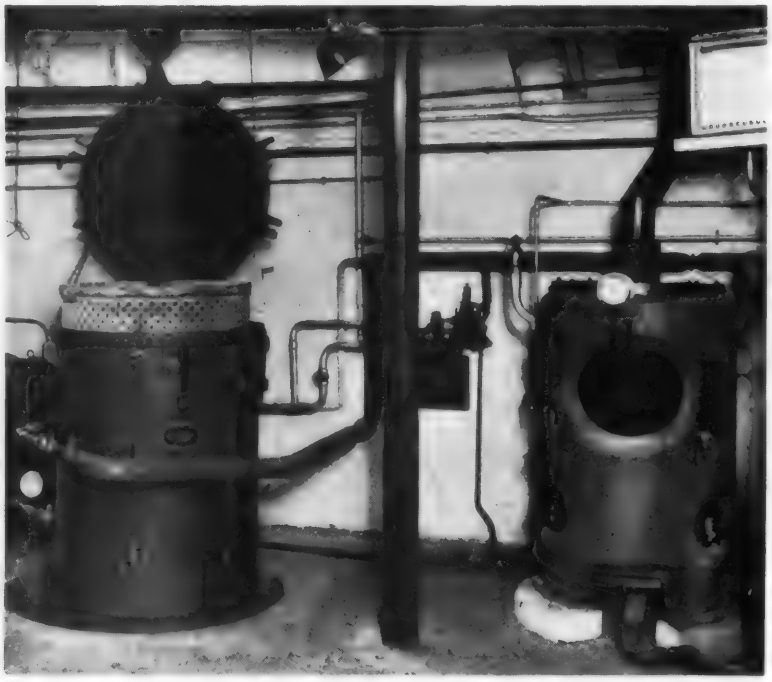
It is claimed by the inventor that the "Cryo-Vac" system can be employed in existing cold storage plants for congealing and storing, but the best advantage would be taken of a special low temperature brine equipment as it would mean a smaller floor space occupied by the system and a resultant saving of B.T.U.s.

Skin Bags

The skin bags which are now made industrially are not costly, and the savings made are above their cost.

The general lines of an equipment are shown in the above diagram I.

• MEAT PLANT AND MACHINERY •



RETORT.—A vertical retort, the "Millwall", made by John Fraser and Son, Ltd., for a soup canning factory. Also shown is the boiler and water pump.

FILTRATION.—Here is a Seitz "Zenit" Filter size 40 in use for the filtration of meat extract in the works of Brand and Co., by whose courtesy the picture is reproduced. A booklet describing Seitz Plant for the Meat Industry is available from the sole British importers, Messrs. John C. Carlson.

FILLING SEMI-SOLIDS.—One of the latest machines made by J. G. Jackson and Crockatt, Ltd., is this filling machine installed in a London fish and meat paste factory. Stainless steel is used for the hopper. The machine is very easily cleaned and has a high output.

BUTCHERS' MACHINERY.—Two machines made by the Lancashire Dynamo and Crypto, Ltd., for the butcher, in actual use.

The Editor . . . . . Sir,

Letters to the Editor about

1. YEAST EXTRACT

"In a note which appears in your issue of May, headed 'A New Yeast Extract' (writes **The Marmite Food Extract Co., Ltd.**), there are two statements to which we take strong exception. They are:

1. '*Hitherto* yeast has only been regarded as a medium which helps to produce many of our foodstuffs', etc.

2. There is no other protein substance, whether meat, fish, fruit or vegetable, which can be compared with "Yeatex"', etc.

With regard to No. 1, we believe this statement was made by our company when introducing 'Marmite' to the public in 1902 or 1903, when it had the merit of being true.

With regard to No. 2, we would like to know on whose authority the claim is made that 'Marmite' cannot be compared with 'Yeatex'. Both statements are so obviously untrue that we do not propose to take up your valuable space more than is necessary to draw your readers' attention to the fact."

The note to which the Marmite Company referred to was one appearing in our "News from the Industry" feature. We are in the habit of extending the hospitality of this section of our journal to manufacturers, and it is of course obvious that the claims put forward are those of the manufacturers themselves, without comment from us.

Here, then, are the remarks of **Fredk. Boehm, Ltd.**, the makers of "Yeatex," on Messrs. Marmite's comments:

"We are very surprised to note the remarks of the Marmite Food Extract Co., on the note on our pure yeast extract 'Yeatex', which appeared in your May issue in the 'News from the Industry' section.

So far as we can see, no statement relating to Marmite appears in the article in question, nor was it our intention to draw any inference or comparison. The note is a straightforward statement of fact dealing with yeast and yeast extract for the general information of the trade, and, in regard to statement No. 1, we submit that this may be regarded as a fair observation on the present-day attitude towards yeast, and is likely to remain so until such a time as the trade and general public become yeast-*extract* conscious.

Statement No. 2, if read as intended, in conjunction with the general body of the context, draws attention to the value of yeast extract as compared with meat, fish, other protein substances, etc.

We welcome the opportunity of emphasising to the trade the big possibilities of yeast extract as a national food."

2. JELLY FLAVOURS

THE article which appeared in our April issue evoked great interest, and we received many letters on the subject. It is evident that a large amount of research has been expended on this question. The communication from **A. Boake, Roberts and Co., Ltd.**, which we print below, presents a new phase of the subject.

"The article that appeared in your issue of April, 1938, entitled 'The Threat to the Jelly Tablet', was most interesting, and we cannot remember previously to have seen the merits and demerits of jelly tablets and jelly crystals so lucidly explained and so concisely summarised. If we may add a comment upon the flavouring of these materials we think it will complete the picture so admirably drawn by your contributor.

Three flavouring difficulties are mentioned in connection with jelly crystals—the inadmissibility of certain natural flavouring substances and in particular of fruit juices in adequate amounts, the inefficiency and insufficiency of available synthetics, the tremendous surface represented by the jelly powder in its granular form and the rapid alteration to flavour this factor causes. These difficulties have been recognised, and that much research has been undertaken to overcome them confirms your contributor's statement that no other aspect of the manufacture of jelly crystals has been given so much thought as that of flavouring; indeed, we can go further and say that from the flavour viewpoint no other food product has been so carefully investigated as the jelly crystal.

The idea of enclosing the flavour in a capsule of sugar or gelatine goes some way towards solving the problem of how to flavour jelly crystals successfully, but although this method ensures some protection for the flavour materials, it appears to be rather clumsy and unhandy in use and comparatively costly to carry out. The ultimate extension of this 'flavour bud' idea is the preparation of flavours in the form of very small particles where each particle consists of a flavour nucleus surrounded by its own protective envelope or capsule.

It is possible to prepare such powder flavours, and they consist essentially of an aggregation of extremely small flavour buds. Not only can they be prepared, but it should be emphasised that they are quite distinct from the kind of powder flavour mentioned in the article. As your contributor points out, these latter consist of sugar in combination with varying amounts of fruit juices, and they mostly fail to afford entire satisfaction.

The advantages of powders in which the flavour is fully protected from evaporation and from oxidation by contact with atmospheric oxygen or through exposure to light are many, and as the powders are free-running, non-hygroscopic, and can be made to contain any required quantity of fruit concentrate or other natural extract there can be little doubt that a great advance in flavour technique has been made."

BOUQUETS FOR THE FOOD INDUSTRY

THE twenty-fifth anniversary of the Food Manufacturers Federation was celebrated on June 1 by a luncheon at the Savoy under the chairmanship of Lieut.-Colonel G. R. Harding, D.S.O.

At the pre-lunch reception we were able to greet personally Colonel Harding himself, J. G. Mathieson, T. Macara, F.I.C., H. Kunzer and J. M. Allan of Frederick Boehm, W. A. Ballard, R. S. Forman, O. Benson, F. Hirst, M.C., A.R.C.Sc., S. Folwell, R. M. Leonard, the Federation Secretary, A. Stevens, A. F. Moyles, of the Thames Board Mills, S. J. Oury, of Oury Millar and Co., Frank Pick, T. A. H. Sycamore.

Sir Thomas Inskip, as guest of honour, was genially in evidence, as was W. S. Morrison, Minister of Agriculture. Sir Henry French, of the Food (Defence Plans) Department, was talking to B. Seebohm Rowntree, whose work for welfare in the Food Industry has added so much lustre to an already famous name. Lord Luke, Lord Amulree, Lord May, were all seated together at the top table.

Sir Thomas Inskip proposed the toast of the Federation, and in the course of his speech handed many bouquets to the Food Industry, which although official were none the less sincere.

He admitted the importance of food storage at once, and at one point revealed the fact that, when the recent uproar in the national Press was at its height, he and Sir Henry French were completing their plans quietly with the assistance of the Federation; and he warmly thanked the members for the fact that their assistance was given without the asking of questions. Not, he said, that such questions would have been answered! Secrecy about the Government's plans for war must be observed.

He officially thanked the Federation for the way in which it had co-operated with the Government in their task of amassing information with regard to stocks held, production capacity and storage space available.

Lieut.-Colonel Harding made a brief but effective reply to Sir Thomas's toast. He said that the Federation was in daily contact with the Government. Among other things he made notable references to canning and the Rowat Research Institution's findings with regard to the equality in food value of canned and home-prepared foods.

In his speech Mr. W. S. Morrison, Minister of Agriculture, complimented the chairman on his many activities and his fine war service.

Following the lunch the Federation proceeded with its usual business meeting.

In addition to those already mentioned, the following were among those present: Colonel J. Sandeman Allen, M.C., T.D., M.P., J. Valentine Backes, C. W. Banks, A. W. Beach, G. W. Cadbury, W. B. Chivers, T. Crosbie-Walsh, F.I.C., Ch. Goldrei, H. J. Green, D. H. J. Hartley, W. Leonard Hill, J. G. Huntley, A. L. Matthison, A. McDougall, C. McDougall, F. Monkhouse, S. W. Pascall, J. Seyfried, C. P. B. Shippam, F. L. Timmins, R. E. Wallis, A. S. Wilkin.

Book Reviews (Continued from p. 225)

The book falls into three main sections: (1) AN "INTRODUCTION," comprising 94 pages—this deals with existing laws and practice; (2) THE FACTORIES ACT, 1937, with explanatory notes; and (3) A COLLECTION OF REGULATIONS. There is also at the beginning a TABLE OF STATUTES, and, in conclusion, an APPENDIX OF STATUTES, both of which are useful to anyone trying to locate any particular section of the Act.

From an academic point CHAPTER I is interesting, as it describes fully the development of Factory Law. There is also a list of notices that must be exhibited in factories and workshops—a matter on which many employers are lamentably ignorant. One would also commend to anyone using steam receivers and the like, pages 43 and 44, which are followed by the existing regulations relating to fire and the provision of escape. In the matter of hoists and lifts, one might have hoped that Mr. Maddock would have elucidated a rather doubtful point. On page 38 we read: "Every six months at least they (the hoists and lifts) must be examined by a competent person whose report must be entered in or attached to the general register." Neither the Act, nor Mr. Maddock, as far as the reviewer has been able to ascertain, informs us exactly what a competent person is. Is he one who has been proved competent or one who has not been proved incompetent? If one employs one of the latter category, on whom is the onus to rest in case of accident, for, in the absence of any definition of absolute competency, one might be justified in employing anyone who has not been unfortunate enough to have an accident. No more information is vouchsafed on pages 137 to 139, where the provisions of the new Act on this subject are discussed.

In regard to the food industries the REGULATIONS RELATING TO BAKEHOUSES, underground and otherwise, are dealt with, and owners of these should note the clauses referring to varnishing, painting or limewashing; points which are sometimes overlooked. Other matters of interest referred to in this Introduction are such as the Truck Acts, Holidays, Home Work (this comprises a large number of trades, including pea picking, THE MAKING OF CHOCOLATES, SWEETS, Christmas crackers and box making).

PART 2 (pages 113 to 356) deals with the new Act of 1937. Each clause is dealt with in the following way: First is given the statement of the Act verbatim; then follows an appropriate note on the clause. Most valuable references are given to relevant legal cases, and the cross indexing here is admirable. It is impossible, and obviously absurd, to attempt to quote from this section of the book. It is a work which can only be referred to when occasion demands and not quoted in a review of this nature. Manufacturers of BREAD OR FLOUR CONFECTIONERY OR SAUSAGES will be interested in pages 224 to 225, but will still be unenlightened as to what "flour confectionery" means exactly, although the author gives a clue in quoting the case of Gee *v.* Davies (1916). The preservation of fish, fruit and vegetables is also dealt with.

One could proceed to enumerate many examples of the usefulness of this book, but that would serve no useful purpose. It is hoped that sufficient has been said to show that it is a most valuable book on the subject of Factory Law, and as such should be found on the bookshelves of every employer and not merely allowed to remain there, but consulted regularly and freely, not only from the point of view of knowing the law from one particular standpoint, but also from the general interest in factory law that should be taken by all responsible employers.

T. H. F.

The Factories Act, 1937. By Leslie Maddock, in collaboration with Sir Gerald Bellhouse. London. Pp. 684. 25s.

Fried Fancy Nuts

E. J. Thomas writes on an unusual subject

[*F.M. photograph.*

The humble peanut acquires a new splendour when fried, salted and wrapped in shiny cellulose sheet. Price, one penny a packet.

THE STEADILY growing popularity of the many varieties of nut-meats which are cooked in oil and salted can be summed up in the one quality, *freshness*. Admittedly, freshness as a quality is in danger of being overworked as a sales point these days, but where fried fancy nuts are concerned this is the essential condition. A palate for these cooked nuts is, in a sense, an acquired one, and is all too easily discouraged if, instead of the crisp morsel of individual flavour the buyer is entitled to expect, he is met with a grease-stained package yielding nuts as flaccid and stale as yesterday's toast.

Recognition of this factor by caterers to this particular branch of the food industry is not meanly responsible for the favour the product enjoys with the public the other side of the Atlantic. Upon the excuse of freshness is built the foundation of the business of the myriad small shops that supply much of the demand upon a cooked-while-you-wait basis; while it has been found necessary, in the case of the factory prepared product, to engage the expense of a somewhat costly distributing system whereby only small deliveries of stock are made which can be quickly cleared by the retail trade. No apology, therefore, is offered for again insisting upon the importance of freshness.

Nut Varieties

The kinds of nuts most in favour for processing represent pretty much a geographical motley. Peanuts, almonds ("broads" or "longs"), brazils, cashews, pecans and pignolias are predominantly popular. Less frequently called for are walnuts and filberts, and only occasionally, pistachios. The nuts are usually packaged mixed. Variety counts for much! Moreover, the mixture is convenient to the manufacturer in that, by means of judicious and not necessarily perceptible alterations to the percentage of his mixtures, he can maintain a steadier cost/selling-price ratio to meet the fluctuations in the cost of individual varieties.

Regarding the form in which the separate varieties are offered, there seem to be distinct preferences for blanched and unblanched nuts and also for nuts of a certain size. Thus, almonds, cashews and pignolias are always just meat and nothing but, the Marcona type of "broad" almond having the edge, perhaps, over the "long" or Jordan type of kernel. Peanuts—either the small "Spanish" kind or the more familiar and larger Chinese varieties—brazils and filberts may or may not be blanched. It is as well, however, that the inclusion of these nuts should be definitely one thing or another; too often a kind of piebald brazil, only half-skinned, is to be seen in company with other nuts whose nakedness is complete or else not visible at all. The smallest size of brazil kernel, known to the trade as the midget, is preferable to the larger sizes. Pecans and walnuts are apparently unblanchable and so are eaten unblanched. The best quality pecan is that known as the "topper," the name indicating almost 100 per cent. freedom from broken meats. "Pieces," whether of pecans or walnuts, are unsightly in any mixture of fancy nuts. As to the actual mechanical job of blanching, few nut processers concern themselves with it. In practically every case nut meats are obtainable in whichever form for which demand is made. Peanuts are the possible exception, but since their blanching is a comparatively simple process for which a number of small units are available, they do not present much of a problem.

Buying Nut-Meats

The soundest guide in buying nut-meats is plain common sense. Badly broken or split meats, or those of poor colour or dried-out-looking, any which exhibit evidence of insect infestation or treatment for it (with

obvious traces of odorous pesticides incompletely removed) and those marred in flavour by the mustiness due to mould growth will obviously be rejected. Little detail, applicable to all nuts, can be given. Each is an entity with its own peculiarities and each requires individual consideration. However, if the buyer finds the nuts fit to eat, to look at, to smell and to taste in the raw he may rest assured, for cooking will do no more than enhance appearance and flavour.

Fried nuts are modest in their requirements of plant for their processing, and such as they do demand is of the simplest. Only one kind of nut should be cooked at a time, as each requires individual treatment. For small batches, up to 40 lb., say, an ordinary sugar-boiler's kettle and a wire basket suffice. Where larger cookings are to be made, however, a somewhat more specialised unit is desirable. The features most necessary in such a unit include a tank—gas or steam-coil heated—for the medium and a form of cooking basket made of perforated sheet iron or the more modern stainless steel, and so fashioned that the bulk of the batch is distributed around a hollow central inlet in order that the heat may be more evenly applied to the entire batch. The basket is further provided with some means by which it can be rapidly raised or lowered out of or into the cooking chamber. This is usually done by means of an attached rope and pulley-block which is fastened to an overhead trolley-track, thus enabling the basket with its load to be easily transported to the cooling and draining trays. The cooling and draining is often accomplished in one operation in one tray which, provided with a false perforated bottom down through which a suction fan draws a current of air, the batch is cooled as quickly as possible and the excess of the medium drained off and returned to the bulk in the cooking chamber. A further feature consists of pump-forced circulation of the cooking medium and automatic filtration of it.

Cooking Media

It is essential that the choice of the cooking medium be given careful consideration. In the first place, one neutral in taste is desirable; the natural deterioration of the rather delicate flavour of the nuts is swift enough without ruining it at the outset! There are other points, too, no less important.

The medium has three primary duties to fulfil. First, it must act as the vehicle by means of which the heat is applied to the batch; second, it must act as bond for the granules of salt, without the savour of which any nut is insipid; third, it must add to, certainly not detract from, the appearance of the nuts.

The first requires that it should be stable at the high temperatures to which it is subject and as permanently so as can reasonably be expected. A medium that deteriorates quickly is more costly in the end than one which has a longer working life and might at first cost a trifle more. By stability to temperature is meant that there shall be little or no change in colour, taste, odour or other physical condition even after repeated heatings and coolings. Under working conditions, when in actual contact with the nuts, it is unavoidable that the medium should gradually degradate, but this should be due rather to the permeation through it of the fat-soluble constituents of the nuts themselves than to any inherent fault of the medium. Frothing is a trait often met and difficult to deal with in frying media, and is usually traceable to the presence of foreign matter in them. This, though, is not always so, for an otherwise docile fat is sometimes caused to froth by an undue amount of moisture in the meats. A crude—but in the absence of specialised knowledge and laboratory equipment—effective method of testing the suitability of a fat or oil for cooking purposes is to subject it to a number of alternate heatings (to about 350° F.) and coolings. The greater the surface of the medium exposed to the air the better for the test. A flat, shallow pan is best for the purpose. If, after about thirty such treatments the medium returns to its original condition unchanged in appearance, taste or colour, if it exhibits little or no smoke at the greatest heat and shows no disposition to froth of itself, it may, from a general view, be considered to meet requirements. There still remain the other factors, however.

The second point, that of the bond the medium is to make between the salt granules and the meats, cannot be dismissed as merely so much hair-splitting. The optimum amount of salt, which, in relation to the flavour of the nuts, the palate requires, is surprisingly constant and lies somewhere between 4 and 5 per cent. The salt granule is easily detached from its anchorage to the side of the nut. It requires, in fact, only the normal handling a carton is likely to receive to impoverish those uppermost in it of their share of the salt to the detriment of those at the bottom of the carton, which are consequently overdosed with it.

Salt

To digress for a moment from the subject of the medium: salt, as a general commodity, is obtainable in such a state of purity that little thought need be given to the point. It should, however, be free from rice flour, magnesium carbonate or any other substance that might be added to make it free-running. If the salt is at all lumpy, it is but a simple matter to pass the few pounds each batch needs through a screen just before it is incorporated. Neither too fine nor too coarse a granulation should be used; both are unsightly. A fine grain, though more tenacious and consequently liable to remain in better distribution throughout the batch than a coarse grain, nevertheless gives the nuts the appearance of having been dusted and robs them of their attractive sheen. On the other hand, a heavy grain, besides being far too easily displaced from contact with the nuts, is tardy in dissolving on the tongue, so that the two tastes, of nut and of salt, instead of being mutual in their effect, remain distinct and unblended. The best granulation, therefore, seems to be a compromise between the two extremes.

To continue with the medium. It would seem as if the one which at normal temperatures is in a solid condition —a fatty medium—is preferable, from the point of view of providing the better bond for the salt, than one which remains fluid. In support of the preference there is also the fact that a solid medium will not permeate and stain the cardboard carton, which is the usual container for

the meats. Here, however, enters the third consideration of appearance. A nut with a thin, but none the less easily discernible coat of "grease," is less inviting to the eye of the buyer than the one which, though slightly oily, is altogether brighter looking. It is no quibble. Also, it is responsible for the number of various cooking media obtainable, each with some point or other in its favour, but which are seldom more than blends of different fats or oils. The problem of the choice of medium is one whose solution results in little more than the expression of preference rather than selection of definite qualities.

Vegetable Oils

As to the nature of the medium, the once widely used mineral oils have taken second place to fats or oils of vegetable origin. Coconut oil, hydrogenated arachis or peanut oil and/or cotton seed oil are now in almost universal favour. They are solid at normal temperatures. Maize oil, although rather inclined to froth and usually more expensive than the others named, is an excellent medium of the oily type.

Mention of the medium would not be complete without some attention being paid to the bogey of rancidity. The fundamental causes of rancidity are still somewhat in dispute, but its effects are unfortunately all too patent. The most reliable guide to the rancidifying propensities of the medium is experiment under representative conditions, with the further precaution of the selection of a medium with a low, free, fatty acid content. If this latter factor is unobtainable by the user of the medium, it should be readily furnished by the manufacturer of it.

Cooking of Nuts

The actual cooking of the nuts is no more, no less, than a matter of personal dexterity and good judgment. In common with all processes whose outcome relies upon a personal factor in control of a change to be wrought by means of the application of heat, few opinions are precisely similar or in agreement on the correct technique to be employed. Again, it must be noted that each kind of nut must be accorded particular treatment, and, further, this treatment, even in the case of the one kind of nut under consideration, must be flexible enough to meet other variable conditions of the constitution of the nut itself. In plainer English, this means that a pecan, say, cooked to-day does not necessarily bespeak the same treatment for the pecan that will be cooked to-morrow. To-morrow's pecan, or brazil, or whatever it is, may be of a different size, it may be drier, it may have been harvested at a different stage in its maturity and therefore the fat content may be greater or less. Other variable conditions that may be introduced are fluctuations in the size of the batch to be cooked at any one time, variations in the temperature of the nuts at the time they are immersed in the medium. (These temperature differences are very liable to occur if a large quantity of nuts has just been taken out of cold storage, say, and have not yet attained the temperature of the surrounding atmosphere.) Either of these factors, by the differing cooling effects they exert as a mass on the medium, may result in a necessary lengthening of the cooking period, or a *slight* raising of the immersion temperature of the medium as compensatory factor.

The Human Factor

All this is to say that the cooking of even such insensible objects as nut-meats is not best accomplished by automata. The human factor, frail though it may be, is essential. Preliminary trials which, in the interests of all concerned, should precede any attempt at the processing of a full-sized batch, may be helped along by the following table:

Kind of Nut.	*Immersion Temperature of Medium.*	*Cooking Time.*	*Remarks.*
	°F.	Min.	
"Chinese" peanuts, unblanched	290-300	6-7	For average to larger grades.
"Spanish" peanuts, unblanched	290-300	5-6	"Spanish" type of nut seldom blanched.
"Chinese" peanuts, blanched	290-300	10-12	Average to larger grades.
Almonds, blanched	280-290	6-8	For "broads" or "longs".
Brazils, blanched or unblanched..	260-270	3-5	For "midget"- to medium-sized kernel
Cashews, blanched	280-290	4-6	High absorbency of medium is chief characteristic of these nuts.
Pecans	280-300	3-5	Little more than the removal of the greater part of their moisture is necessary.
Pignolias	280-300	4-5	Several kinds of these kernels met with, indicating somewhat variable treatment.
Walnuts	280-300	3-5	Little more than the removal of the greater part of their moisture is necessary.

The table lays no claim to infallibility, and its limits are sufficiently wide to allow for considerable difference in the expression of the final result. At just what point the optimum lies—if, indeed, there *is* an optimum—it is impossible to say. The first few trials, though, will invariably tend to overcooking rather than undercooking.

Loss in Weight

The loss in weight of the batch as the direct result of cooking is less than might be imagined. Because of the replacement of the weight loss due to expulsion of moisture by an almost equal absorption of the medium by the nuts, the total loss in any mixture is seldom in excess of 2 or 3 per cent.

In conclusion, and to revert to first considerations again, the halo imparted to such things as wine, violins and tobaccos by ageing is not bestowed upon cooked fancy mixed nuts. They must be *fresh*!

NEWS FROM THE INDUSTRY

Mutton Canning in Scotland

Leading men in the West of Scotland are believed to be interested in a project which is afoot for the establishment of a canned mutton industry in Scotland. If this plan matures then farmers in Scotland will have a local outlet for their produce at a price which will encourage their co-operation. The canned mutton would, of course, have its chief market abroad owing to the ample supply of fresh mutton on the home market. Although full and exhaustive details are not yet ready, it is suggested that perhaps one small factory will be working in the West of Scotland before the end of the year.

* * *

Britannia's Key

Mr. Tom Purvis's poster for the 1939 British Industries Fair, which will be held in London and Birmingham from February 20 to March 3, will give the well-known lettering, B.I.F., in bronze-blue on a deep red background. The key and date in white form a decorative monogram in the corner, with the rest of the lettering in white at the foot.

"This year", said Mr. Purvis, "we are driving home the essentials —the B.I.F. lettering, the sign of the Fair all over the world.

"The key, which for a number of years has been the symbol of the Fair, is this year used as a decoration. It represents, of course, the key to prosperity, trade, and world opportunity."

Britannia, who in earlier years, called the world to the Fair, has retired from the poster, but her trident is still retained; it is the basis of the design for the handle of the key.

* * *

Earl Radnor New Chairman at Rothamsted

The Earl of Radnor has been appointed Chairman of the Committee of Management of the Rothamsted Experimental Station. This appointment is in accordance with the long-established usage at Rothamsted of choosing a Chairman from among those who are intimately associated with the land; previous Chairmen have included such well-known agriculturists at Lord Clinton, Sir Merrik Burrell, Lord Bledisloe and others. Lord Radnor's active interest in rural development and his wide knowledge of the many intricate problems of modern agriculture will undoubtedly prove of great value to the Station.

* * *

Extensions to Instrument Works

The picture shows part of the most recent extension to the Century Works of Elliott Brothers, the electrical instrument makers for the Food Industry. This recent extension, with a floor area of over 24,000 sq. ft., has been built exclusively for the production of small instruments and is equipped with Electrical Distance Thermometers which register the different temperatures throughout the building on a multi-way indicator in the Boiler House.

Cheaper Chocolate

The reduction of the prices of some of Cadbury Bros.' standard chocolate lines is part of the firm's policy of passing all benefits, also price changes, to the consumer. Prices were naturally affected by the rise in the cost of raw materials of a year ago, but as these prices have since come down in many cases, without corresponding reductions in the price of the retail goods, it is hoped that Cadbury's creditable action will give a lead to many other manufacturers.

* * *

Nestlés go to Antrim

The firm of Nestlé, famous for their full-cream condensed milk, have set up a milk processing factory in County Antrim planned with a view to large expansion. Negotiations are under way in Londonderry for a similar project.

* * *

A Seventy-Fifth Anniversary

John Feaver, Ltd., have just completed seventy-five years of meat can manufacturing, and the name "recognised specialists" has been well earned.

The making of meat cans is a very different problem to that of any other food container. Automatic mass-production is in many cases out of the question on account of the irregular shapes, and also because the numbers used, although considerable, are not so large as, let us say, fruit and vegetable cans.

The process of preserving, too, is much more severe than with most other packs, and a microscopic flaw which would not develop in an ordinary tin, would lead to serious trouble in a meat can. Consequently each tin is scrutinised individually before being sent out. Another point to bear in mind, also, is that the value of the contents of a meat can is in almost every case much greater than in other packs, and this fact makes careful supervision of the greatest importance.

It need hardly be mentioned that the plates used for making these meat cans are heavily tinned, because whereas sulphur staining cannot be avoided, iron sulphide staining would penetrate the meat.

* * *

The London office of the "Drum" Engineering Co., Ltd., at 38, Victoria Street, S.W. 1, has a new telephone number, it is Abbey 3961.

Canning Whale Meat

Claiming to have set a record for the number of whales caught during a season, the Norwegian whale factory ship, *Thorshammer*, recently docked at Cape Town after six months' cruise in the Antarctic. The factory ship took 1,065 whales during the season, and in the holds of the vessel were 19,500 tons of whale oil, roughly equivalent to 117,000 barrels.

The *Thorshammer* is, according to reports, the only vessel in the world canning whale meat. During the season about 10,000 tons of whale meat were canned, and it would seem that this new canning industry is promised a rather bright future. It is said that whale meat tastes and smells very much like cooked rump steak.

* * *

Insects' Infestation of Grain

Destruction of stored grain and grain products by insects causes great loss, probably amounting annually to not less than £500,000. More information is required before the problem can be completely tackled. The first step is a scientific survey, which is to be made at once, during the period of seasonal activity of the insects. This survey has been organised on the initiative of the various sections of industry concerned, and the major part of its cost will be met by their contributions. It is to be carried out, under the auspices of the Department of Scientific and Industrial Research, by the Stored Products Laboratory of the Imperial College of Science and Technology.

The co-operation of all sections of industry affected is essential to the success of any organised attack on these insect pests. The neglect of one section to play its part will jeopardise the success of the efforts of all the rest. The conference therefore viewed with satisfaction the extent of the support so far accorded, and passed unanimously a resolution commending the support of the investigation to the earnest consideration of all sections of trade and industry which suffer from the destruction of stored grain and grain products by insects.

Any organisation or undertaking wishing to co-operate in this work should communicate with the Secretary of the Department of Scientific and Industrial Research.

* * *

On May 13 the London offices of British Cellophane, Ltd., were removed to 17/19, Stratford Place, London, W. 1. This change of address was necessitated by expansion of business and, therefore, the need for more commodious premises. The new telephone number is Mayfair 8721.

New Glass-hard Lining for Food Plant

Invented in an attempt to provide a better protection for tanks in the brewing industry, Lithcote has had a surprisingly successful career. It was produced after long research in the field of phenolic and other synthetic resins. In the picture it is applied to a portable baking furnace for use in confined space in a brewery cellar. Newton Chambers and Co., Ltd., market Lithcote in England and issue a good booklet about it.

For Unemployed Executives

Now there is an employment exchange for the more important executives! It is not quite called by that name: the Confederation of Management Associations who have organised it call it the Management Appointments Board. We were told that it is "unique as an experiment in centralising the appointments work for executive posts in industry". A register of appointments covering over 17 vocations is maintained. When an executive gets a job through the Board the fee is paid by him, not by his new firm. The Board is licensed by the L.C.C.

The members of the Board, responsible to the Confederation for its conduct, are:

F. W. Lawe (Personnel Manager to Harrods, Ltd.).
Geoffrey Marchand (Director of the Glass Manufacturers Federation).
Reginald Pugh (Hon. Secretary of the Confederation of Management Associations).

* * *

Seitz Böhi Clarification

Just issued by the Alfa-Laval Company is a leaflet which deals very thoroughly with their F.D.12 preclarifier and their F.D.5 clarifier used for the clarification of fruit juice in conjunction with the Seitz Böhi process. The leaflet is printed in German, but the Company have available copies with an English translation.

British Representatives

The F. J. Stokes Machine Company of Philadelphia, Pa., announce the appointment of Apex Construction, Ltd., chemical and pharmaceutical engineers, Swan House, 133-5, Oxford Street, London, W. 1, as their British representatives for the sale of the Stokes line of tablet making and pharmaceutical equipment as well as their tube, jar and powder fillers. Mr. William C. Peck, M.Sc., A.I.C., Managing Director of Apex, will be remembered by readers as the author of an article in our December issue on "The Design of Drying Plant for the Food Industry".

* * *

Aluminium is A1!

All the opinions on the demerits of aluminium as a metal for cooking foods are devastated in a booklet issued by the British Aluminium Hollow-ware Manufacturers' Association. It is called "Aluminium is Nature's Own Food Metal". Truly the case presented for aluminium is formidable, utilising, as it does, medical and other authoritative opinion, including a recommendation by Dr. L. H. Lampitt. Such productions as this must assuredly do a lot to convince the sceptics who would condemn the use of aluminium with food.

* * *

The new factory of Stafford, Allen and Sons, Ltd., is situated at Wharf Road, City Road, London, N. 1.

Development of *p*H Apparatus

Marconi-Ekco, instrument makers in many fields, have introduced a *p*H meter suitable for both laboratory and industrial use, which they claim to be the most advanced of its type. It is simple in operation, gives accurate results, and can, moreover, be used by unskilled personnel. Furthermore, it is mains operated, which is a great advantage over battery driven models and lends itself to continuous recording and automatic control. It also incorporates a system of automatic temperature compensation, and the glass electrode system is really robust.

A direct reading of the solution under test is given in terms of *p*H, the range being 0 to 14. An alternative calibration in millivolts, range 0 to 1,500, is also available, and the accuracy is + or −0·02 *p*H unit, and + or −0·2 per cent. in millivolts, respectively. Power supply is 200 to 250 volts, 40 to 100 cycles, and the performance is independent of mains fluctuations.

* * *

New "Brush" Board

Brush Electrical Engineering Co., Ltd., makers of homogenisers and other machines for the food industries, has recently had its Board of Directors reconstituted. Here is the new Board:

Chairman, Sir Ronald Wilfred Matthews, Kt., J.P.

Deputy Chairman, J. R. Greenwood, Esq.

Directors, Sir Herbert Brent Grotrian, Bt., K.C., J.P.; Sir Richard Arthur Pease, Bt.; Arthur Tyler Brotherton, Esq., J.P.; Alan Paul Good, Esq.; Thomas Bettsworth Keep, Esq.; Harold E. Midgley, Esq., M.A.(Cantab.), M.Inst.C.E., M.I.Mech.E., M.I.E.E.; Allan Miller, Esq.

* * *

"Cellophane"

So accustomed are we becoming to the word "Cellophane" that when reference is made to transparent cellulose sheet generally the word is often used as a generic term with a small "c". Our contributor, G. Malcolm Dyson, made this slip in his article in the last FOOD MANUFACTURE on "The Colour and Flavour of Packed Foods". We hasten to emphasise that the word "Cellophane" is the Registered Trade Mark of British Cellophane, Ltd., and can only be used when referring to their particular brand of transparent cellulose sheet.

* * *

A.R.P. Equipment Storage

A well-documented leaflet from Constructors, Ltd., deals with the storage of A.R.P. equipment in factories. Advice and plans are given and Home Office figures are quoted.

Denmark—Food Producer Supreme

The recent National Agricultural Exhibition at Copenhagen gives point to some interesting notes on the great industry of Denmark—the producing of food.

It was in June, 1788, that the villenage system which bound the peasants to the estates of their overlords was abolished. To-day, 150 years later, the descendants of those peasants are the small farmers who are the backbone of the Danish agricultural industry. Denmark, a country little bigger than Wales, now produces a quarter of the entire world's export of butter and eggs, and two-thirds of the bacon imported into this country from foreign lands.

The exhibition was no mere agricultural show; it was a truly national effort in which the whole kingdom took part, including the remote Faroe Islands and the Greenland Settlements.

Poultry was represented by a big show; and special sections were devoted to rabbit-breeding, bee-keeping and the breeding of fur-producing animals, all important rural industries.

Apart from the Dairy Section at Bellahoj, a Dairy Show was held at the Forum Hall in the centre of Copenhagen. Here butter, cheese and processed milk were shown and every stage of their production demonstrated. Over 1,500 Danish dairies took part; butter, eggs and cheese being some of the country's most important exports.

The woman's side of farm life, which is such an important factor in a successful agricultural community, was dealt with in a special section, wherein were demonstrated the latest developments in domestic economy, labour-saving devices, rational feeding and the care of babies.

In brief, this national exhibition was planned faithfully to mirror a century and a half of Danish progress, to present to true picture of the Danish farmer's life and to show the importance, at home and abroad, of Denmark's national industry of agriculture. In this it has succeeded remarkably well.

* * *

Compressed Containers

A good range of compressed paper and other containers for the food industry are made by British United Products, Ltd. Particularly striking was their range made of thin, tough, compressed paper which has a hard surface glaze. This gives the effect of an opal container, and it is only upon closer examination and when it is lifted that the real composition of the container is discovered. The company will be particularly glad to see visitors at their well-stocked showrooms at Abbey House, Victoria Street, London, S.W. 1.

New Motors for Old

We have received a booklet from the Brook Motors, Ltd., of Huddersfield, which contains a statement that only 5 per cent. of existing motors comply fully with the requirements of the Factories Act of 1937, which, as is well known, comes into operation in July, 1938.

Factories Act of 1937, Part 2, Section 12, demands that all rotating parts of machinery be adequately fenced or screened so that it is not possible for any part of any person to come in contact with same. Brook Motors point out that many of the motors they have made have been running for nearly 40 years, but that they are getting out of date. The modern motor has: (*a*) Stronger shafts; (*b*) ball and roller bearings; (*c*) increased grease storage; (*d*) higher electrical efficiency; (*e*) greater mechanical strength; (*f*) dynamic balance of all rotating parts; (*g*) full compliance with the latest Factories Act.

Brook Motors, Ltd., make the offer to bring any factory up to date with modern motors at reasonable cost, and it is also possible to have installed the latest type of protected motor designed to comply with the new Factories Act, or, alternatively, exchange the present type for the latest modern type of totally enclosed surface-cooled motor, which gives even higher electrical performance and is immune from damp and dirt, at a much-reduced price.

A generous discount off the price of a modern machine is given in exchange for any motor not more than 20 years old. This allowance is dependent upon the age of the existing machine and may reach a maximum of 50 per cent. discount off the price of a new motor. Brook Motors also are prepared to convert any existing motor to comply with the Factories Act of 1937. They have branches in Birmingham, Bristol, Glasgow, Leeds, Leicester, London, Manchester, Newcastle and Sheffield.

* * *

Steel Manufacturing Plant

A well-illustrated leaflet from Marshall, Sons and Co. (Successors), Ltd., describes some of their more important productions in the way of steel fabrication. Among this company's specialities are jacketed pans for the jam manufacturer.

* * *

Food Needs Labels

Labelling and wrapping machines for the food industry are a speciality of Beth Label and Wrapper Machines, Ltd., of London, N. 4. They are always glad to supply information regarding their particular makes.

INFORMATION and ADVICE

Cold Mix Powder—Jelly Tablets—Tomato Paste Imports—Overboiling Lemon Cream—Liquid Coffee and Chicory Essence—Prepared Honey —Banana Flour—Waxing Barrels

Cold Mix Powder

3,491. *Would you please let me have some information on how to manufacture cold mix powder for making ice-cream?* (Bow.)

In dealing with ice-cream powders, it should be realised that it is not possible to get butter fat in a stable powdered form. True, it is present to the extent of 25 to 26 per cent. in full cream milk powder, but this product does not keep as well as the skim-milk powder, and so is not often used for manufacturing ice-cream powders. A very modern form of these powders and one which is increasing in popularity is known as the "cold mix" ice-cream powder, in that no heating is required in the preparation of ice-cream from it. These cold mix powders all contain as their base skim-milk powder, sugar and a colloid. The general directions for use are to take 1½ to 1¾ lb. to the gallon of milk, or mixture of milk and cream. Beat together and freeze. It is obvious, however, that mixes made on these lines would be thin, lacking "body", so the manufacturers often add some filler and increase the colloid so that the viscosity may be raised. Owing to the fact that these mixes are not heated, ordinary cornflour or other starchy fillers cannot be used, nor can gelatine be used, as the stabiliser, as this is insoluble in the cold. Other colloids in common use are gum tragacanth, gum arabic, or mixtures of the two, and certain mosses, like Irish and Iceland mosses, or preparations of these. For fillers may be used very finely powdered, dried egg-yolk —an expensive ingredient—or else substances such as soya bean flour. This latter, when obtained very finely milled and unextracted, is finding increasing favour.

In order, therefore, to make a batch of 100 lb. of ice-cream powder, the following recipe might be useful:

Sugar finely milled	.. ..	70 lb.
Skim-milk powder	.. ..	17·5 ,,
Filler, say soya bean flour	..	7·5 ,,
Colloid, say gum tragacanth	..	5 ,,

Care should be taken in choosing the brand of milk powder, as many are not completely soluble. It is usually found that a powder prepared by the spray process is to be preferred. These ingredients, with any colour desired, should be very well mixed together—an efficient mixer will be required here—and packaged as soon as possible. The colour may be incorporated in the powder form if the following precautions be taken.

First sieve the powder colour through a 100-mesh sieve, and then grind the required quantity into a portion of the sugar, and sieve this into the batch in the mixer. Unless this be done, and it is easily done by hand, it is almost impossible to secure an even distribution of the colour, owing to the extremely small amounts, often less than 1 gram, required.

Jelly Tablets

3,900. *We should be pleased if you would let us know whether any article has appeared in your valued journal in connection with jelly tablet manufacture.*

We presume that you have noticed the article "The Threat to the Jelly Tablet" in the April issue of FOOD MANUFACTURE. The following information appeared quite a while ago, and we quote it in case it may interest you.

"33 lb. of a really good grade of gelatine are soaked all night in water, and the next morning should weigh about 60 to 66 lb. The process is started by heating 56 lb. of glucose in a 40-gallon pan, and, when it boils, adding 112 lb. of sugar and 3 gallons of water. The whole is thoroughly mixed and boiled. The wet gelatine is then added, a few sheets at a time, till the whole has dissolved. The pan will need careful stirring during this addition, and the steam pressure will have to be kept at about 30 to 35 lb. or the gelatine will tend to cake round the sides of the pan: if the pan is slow in boiling, an extra gallon of water may be added.

When the gelatine is all dissolved, steam is turned off and 2½ lb. of citric acid are added, and stirred till dissolved. The mixture is then rubbed through a 30-mesh copper sieve. The colour and essence are added, and the mixture allowed to stand in a separator for an hour, so that the air bubbles may rise to the surface. The clear jelly is then run off from the bottom of the separator into moulds and allowed to set. It can be cut by machine or hand into the required sizes. The yield should be about 44 dozen pint squares.

Tomato Paste Imports

3,888. *Could you inform me of the quantities and values of the imports into the United Kingdom of tomato paste and purée during the four months ended December 31, 1935, 1936 and 1937?*

The following figures state the quantities and values of imports of tomatoes "preserved in airtight containers". There are no separate figures issued for tomato paste and purée:

	Quantity (cwt.)		
	1935.	1936.	1937.
September ..	92,314	26,958	181,861
October ..	194,844	132,665	229,974
November ..	241,160	146,184	200,923
December ..	89,966	107,574	123,984

	Value (£)		
	1935.	1936.	1937.
September ..	83,814	31,561	212,338
October ..	204,078	144,132	262,734
November ..	276,837	160,953	229,493
December ..	114,739	114,758	140,369

Overboiling Lemon Cream

3,882. *I wish to take the opportunity of seeking some information regarding the overboiling of lemon cream, which I make, when it is placed in the oven. I might add that in the making of the cream I only just allow it to come to the boil, then shut off my steam, then empty the cream into a cooler until cool enough for packing. Do you think I don't boil it enough or is there not enough flour* (8 *lb.*) *as cornflour* (12 *lb.*) *in my batches, which yield* 2¼ *cwt.* (Manchester.)

It is difficult to reply to this, as you do not say what is the matter with the cream that you are making according to the details you give. Could you let us have further particulars indicating exactly what is the matter with the present product.

We do not want to obtain any trade secrets, but unless you give us the formula that you are using we fail to know how we can advise you. We are very pleased to note that you are a regular reader of Food Manufacture, that this has helped you in your work, and we hope that it will do so in the future.

Liquid Coffee and Chicory Essence

4,077. *We are considering the matter of introducing a coffee and chicory essence in liquid form. Our business hitherto has been confined to the marketing of dry coffees only, and it should be presumed that we know nothing at all about coffee essences and how to prepare them. What we want is expert advice not only regarding preparation of an essence* (i.e., *recipe, ingredients, treatment, etc.*), *but particulars of plant required, containers, etc.* (Durban.)

We do not undertake to give manufacturing methods for proprietary products, but intelligently prepared, according to the following simple operations, a good product may be made:

Firstly, consult a coffee blender for the coffee blend, and use it freshly roasted and ground. If addition of chicory is desired, use about 50/50 of coffee and the chicory. If the water is hard, then add 1 oz. carb. soda to 24 gal. of water used.

Take—

64 lb. ground coffee.
28 gal. water.
56 lb. loaf or crystal sugar.
8¾ lb. caramel sugar.

Mix the coffee with 14 gal. of the water (boiling), cover, and keep warm for about two hours, strain, press, and stand aside. Re-infuse the "grounds" in the remaining 14 gal. of water (boiling) for one hour, then press and strain. Next, evaporate this second brew, so that when mixed with the first liquor, stood aside, the two produce 10½ gal. In this dissolve the caramel. If desired, add 1 pint (20 fl. oz.) of strong Jamaica rum to each 7½ gal. of the finished coffee essence. It will preserve and add to the cherishing effect of the coffee. Some makers add rum essence instead of the rum (quantity according to strength of rum essence). Salt is an optional addition, and is said to round off the flavour; it also acts as a preservative, as does the Jamaica rum. Fill into bottles while hot or warm, and as a precaution sterilise in the usual manner.

Prepared Honey

4,075. *We shall be very much obliged if you can inform us of the method and the products used in the manufacture of what is termed "Prepared Honey". We understand this product is a mixture of invert sugar, glucose and honey essence, and if you can enlighten us in any way as to a satisfactory method of production we shall be very much obliged indeed.* (Edinburgh.)

We have pleasure in giving you the following recipe:

Water	9 gal.
White sugar	45 lb.
Glucose	45 ,,
Refined maple sugar	10 ,,
Honey essences	2 fl. oz.

Place the water in a steam pan and bring to the boil. Add the sugars, stir well, and bring again to the boil. Then add the glucose, mix well, and boil to 238° F. Skim well and add the essences, which should be well stirred in. The product should be added while in a hot condition.

Banana Flour

3,980. *What have been the imports of banana flour into this country during the past year?* (London.)

We understand on good authority that there have been no imports of banana flour into this country during the past year. It seems that the Jamaica producers dispose of all their output in their home market now.

Waxing Barrels

4,069. *We shall be much obliged if you will let us know the correct procedure for waxing barrels for fruit pulps.* (London.)

We have not been able to obtain information on the waxing of barrels, beyond the fact that the operation requires some experience, and for success the barrels must be quite clean and dry inside. Enamel is an alternative to wax, and the following firm manufactures a special type for fruit barrels, and should be able to give you information regarding application. The name of the firm was given.

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NEW COMPANIES

E. G. Alford, Limited. (340243.) May 13. 204, Siddals Road, Derby. Millers, etc. £3,000. Dirs.: E. G. Alford, Mrs. I. L. Alford, 20, Breedon Hill Road, Derby.

R. Allen and Company (Butchers), Limited. (340339.) May 16. 117, Mount Street, London, W. 1. Butchers and purveyors. £5,000. Dirs.: E. Covell, 117, Mount Street, W. 1; L. G. Cooper, 127, Half Moon Lane, S.E. 24.

E. Carter and Company, Limited. (340485.) May 20. Jubilee Works, Tamworth Road, Old Sawley, Long Eaton, Derby. Mnfrs. of and dlrs. in aerated mineral waters, etc. £4,000. Permt. gov. dir.: A. J. Marmont, 77, Tamworth Road, Old Sawley, Long Eaton.

T. Chapman and Company, Limited. (340307.) May 14. 64a, Bridge Street, Manchester. Importers, exporters, and mchts. of meat, live and dead stock, etc. £1,000. Dirs.: T. C. Chapman, Union Hotel, Parkgate, Cheshire; R. H. Booker, 39, Albert Road, Whalley Range, Manchester.

Cooper and Boffin (1938), Limited. (339963.) May 5. Bakers, confectioners, and café proprs. £10,000. Permt. dirs.: F. J. Archer, 40, St. Clements, Oxford; J. W. Paine, 1 and 2, South Parade, Oxford; C. R. Paine, 304, Banbury Road, Oxford.

Fish Exports, Limited. (340399.) May 18. Fish exporters, fish mchts., etc. £5,000. Dirs.: A. Stirk, G. W. Stirk, 275, St. George's Road, Hull; T. E. Stirk, Ascot House, Harland Rise, Cottingham, E. Yorks; E. Stirk, Dunnottar, Harland Way, Cottingham; J. Stirk, Palmdene, Harland Way; S. Blondahl, 262, Anlaby Road, Hull.

Garden Fresh Foods, Limited. (339766.) April 29. Mnfrs. of frozen food products, etc., in accordance with the Haslacher Process or any other process. £32,500. Dirs. to be appointed by the subs.

General Trading and Fruit Agencies, Limited. (340636.) May 25. Importers and exporters of and dlrs. in fruit, honey preserves, vegetables, etc. £1,000. Dirs.: A. Parkin, Alcira, Warren Drive, Wallasey, Cheshire; L. M. Adam, Uphill Cottage, Cowden, near Edenbridge.

Green Park Hotel, Limited. (340491.) May 20. Howard Park Hotel, Aston Clinton, near Aylesbury, Bucks. Hotel and café keepers, etc. £3,500. Permt. dirs.: G. H. Gordon, 29, St. James's Place, London, S.W. 1; D. Haslett, The Shack, Bisley.

Gualdi - Cazzani, Limited. (340571.) May 23. 16-17, Jermyn Street, London, S.W. 1. Restaurateurs, caterers, etc. £4,000. Permt. dirs.: Andrea Gualdi, 9, King Edward Mansions, Shaftesbury Avenue, W.C. 2; Mario Virginio Cazzani, 3, Gerard Mansions, Gerard Street, W. 1.

L. P. Light, Limited. (339782.) April 29. 2, Bullace Lane, Dartford, Kent. Pie and cooked meat mnfrs. and salesmen. £900. Dirs.: L. P. Light, Crown and Anchor, 80, High Street, Dartford, Kent; Mrs. E. L. Light.

Model Milk Bars, Limited. (339876.) May 2. 106, Cheapside, London, E.C. 2. Proprs. of milk bars, etc. £1,000. Dirs.: J. Cohen and Eva Cohen, 50, Aylestone Avenue, London, N.W. 6.

N.R.H., Limited. (339790.) April 29. 166, Piccadilly, W. 1. Mnfrs. of equipment for preparing, cooking, or serving food, etc. £500. Dir.: F. J. F. Nichols, Asteys, Hadley Wood, Middlesex.

A. J. Ponte and Company, Limited. (339411.) April 20. Importers of and dlrs. in eggs, butter, milk, and dairy-farming produce, etc. £10,000. Dirs.: A. J. Ponte, 45, Avenue Ed., Mesens, Brussels; R. A. Jones, 3, Common Field Road, Banstead; B. C. Bentley, 30, Farleigh Road, Warlingham; L. Ponte, 60, Park Lane, W. 1.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.

TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.)

BEEFEATER.—584,704. **Dripping for use as food.** WESTERN MARGARINE, LTD., Alliance Factory, Western Avenue, Acton. London, W. 3. May 18.

Dripping and goods of the same description will be struck out from the goods of Registration No. 438,687 (2401) if and before the applicants' mark is registered.

CARDINAL.—584,646. **Canned meats.** R. LEHMANN AND CO., LTD., Peninsular House, Monument Street, London, E.C. 3. (Associated.) (By Consent.) June 8.

CORONA.—584,319. **Dried peas for food.** WALTER HOLMES, LTD., 61, High Street, Kingston-upon-Hull. May 25.

GREEN PASTURES.—583,069. **Canned fruits, canned vegetables, canned fish, dried fruits, jams, jellies, fruit pulp, and fruit juices (not alcoholic).** LEETON CO-OPERATIVE CANNERY, LTD., Murrumbidgee Irrigation Area, Leeton, New South Wales, Australia. June 1.

HYPOINT.—585,317. **Ice-cream powder, custard powder, pudding powders, preparations for beverages, and cereals (for food).** GEORGE ADAM SAVAGE, trading as Hypoint Products Co., 289, Holywood Road, Belfast, Northern Ireland. June 1.

JANDOR. — 584,790. **Bacon.** BRISTOL BACON BROKERS, LTD., 47, Milk Street, Bristol. May 25.

KARABAR.—584,928. **Biscuits.** GEORGE KEMP, LTD., North Circular Road, Cricklewood, London, N.W. 2. June 8.

MAPLAN.—584,924. **Substances used as food or as ingredients in food.** BOOTS PURE DRUG CO., LTD., 37, Station Street, Nottingham. May 25. (Associated.)

OLD SCHOOL TIE.—584,277. **Canned fruits.** OXO, LTD., Thames House, Queen Street Place, London, E.C. 4. June 1.

PARKAY.—585,174. **Margarine.** KRAFT CHEESE CO., LTD., Silverdale Road, Hayes, Middlesex. (By Consent.) June 1.

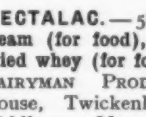
PROSOL.—585,151. **Food for infants.** TRUFOOD, LTD., Wood Street, Bebington, Wirral, Cheshire. June 1.

SPANGLE. — 585,264. **Flour.** CANNON AND GAZE, LTD., Bankside House, Leadenhall Street, London, E.C. 3. May 25.

TARKELITE.—584,957. **Preparations for use as ingredients in bread for the purpose of assisting yeast growth and increasing the generation of carbon dioxide.** BRUCE STARKE AND CO., LTD., 16, Water Lane, Great Tower Street, London, E.C. 3. June 8.

TREX.—584,151. **Vegetable fats for cooking and frying.** J. BIBBY AND SONS, LTD., 21, King Edward Street, Liverpool. (Associated.) (By Consent.) May 18.

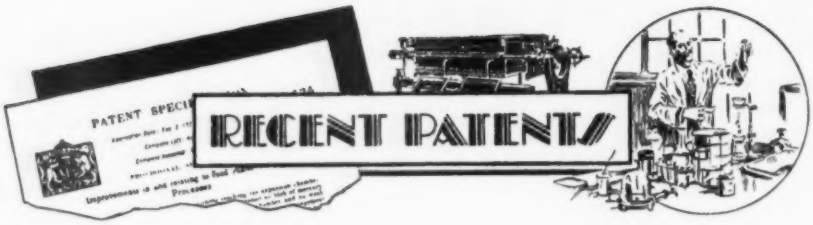
TURPIE'S PRIDE.—B 585,057. **Cooked hams.** GOODWIN FOSTER BROWN, LTD., 8, Parsons Street. Dudley. June 8.



User claimed from March 25, 1921.

Registration No. B 469056 (2518) will be cancelled if and before the applicants' mark is registered.

VECTALAC.—583,862. **Condensed milk, cream (for food), dried milk (for food), dried whey (for food), cheese, and butter.** DAIRYMAN PRODUCTS, LTD., Garvin House, Twickenham Road, Isleworth, Middlesex. May 18.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The "Official Journal of Patents" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

13887. MIAG MUHLENBAU UND INDUSTRIE AKT.-GES., and GEHLE, H.: Apparatus for treating corn, etc. May 10.

14004. HALE, E. G.: Device for crushing shelled eggs. May 11.

14272. MOORE, W. G.: Extraction of separable matter from herbs, etc. May 13.

14918. LAING, J.: Apparatus for preserving foodstuffs. May 19.

14602. WEIZMANN, C.: Yeast preparations. May 16.

15235. SJURSETH, A.: Manufacture of foodstuffs. May 21.

15318. SOC. DES PROCÉDÉS IDEAL: Process, etc., for preserving vegetables. May 23.

15580. BROOKS, R. B. D., and HARMAN, J. P.: Packing, etc., of foodstuffs. May 25.

31397. JOOS, O. H.: Manufacture of products for improving the baking qualities of flour, etc.

31403. CHALMERS, J. W.: Packages.

31489. HUGHES, C. L. (BUFFALO ELECTRO-CHEMICAL CO.): Bleaching of fibres of vegetable origin.

31536. RAYNOLDS, J. W.: Containers for food, etc. (United States, December 18, 1936.)

31600. HANESCHKA, H.: Method of obtaining fats, etc., from waste materials. (Austria, November 17, 1936.)

31604. ALFA-LAVAL CO., LTD.: Apparatus for handling milk in bulk.

31605. CORDEROY, N.: Measurement of the flow of milk, etc.

31608. HOFFMAN-LA ROCHE AND CO. AKT.-GES., F.: Manufacture of compounds from aceto-halogen-sugars and nicotine acid amide. (Switzerland, December 8, 1936.)

31751. DANTZIG, A. VAN: Production of soluble pasty products for sweets, etc.

31791. CHEMTEX, LTD.: Culinary salts. (Australia, November 19, 1936.)

31822. MCDONALD, H. M.: Clarification, etc., of milk and cream. (Australia, November 19, 1936.)

31838. MACNAMARA, H. J.: Appliances for cooling milk.

31994. SUBMARINE SIGNAL CO. (LONDON), LTD. (SUBMARINE SIGNAL CO.): Treatment of milk.

32048. DEWHURST, J.: Vessels for melting butter, etc.

32187. FRASER, J.: Egg cartons.

Complete Specifications Accepted

482,826. I.G. FARBENINDUSTRIE AKT.-GES.: Manufacture of extracts of spleen or liver.

482,880. KODAK, LTD. (EASTMAN KODAK CO.): Preparation of vitamin D in high yields.

482,846. NEVE, T. A. DE: Preparing food products from papaya fruit.

483,003. PRESERVATORS, LTD., and RYNER, A.: Protection of vegetable and animal goods during storage. (Cognate application 8711/37.)

483,036. HILL, W. C.: Apparatus for extracting oils, juices, and the like from fruits. (Divided out of 481,356.)

483,097. MOLDAWSKY, J.: Meat-tendering apparatus.

483,208. KALIN, L.: Apparatus for beating or stirring edible substances, in particular cream.

483,309. POLLACCI, G., CIFERRI, R., and GALLOTTI, M.: Preservation of vegetable products.

483,337. BARON, R.: Edible crisps.

483,430. FISCHER, H.: Production of albuminous solutions resembling white of egg.

483,503. CROSSE AND BLACKWELL, LTD., CLAYTON, W., and SUMNER, C. G.: Marking metal articles.

483,523. POLLAK, J. E. (INTERNATIONAL PATENTS DEVELOPMENT CO.): Manufacture of cocoa and chocolate compounds.

483,550. DU PONT DE NEMOURS AND CO., E. I., and WERNLUND, C. J.: Protein compositions.

483,587. WEIZMANN, C.: Foodstuffs.

484,431. ALEXANDER, P.: Aeration of cream.

484,477. INDUSTRIAL PATENTS CORPORATION: Methods of improving, shortening, and the improved shortening resulting therefrom.

484,578. SHONE, G. E.: Means for use in supporting bacon and other foodstuffs during curing.

484,616. STANDARD BRANDS, INC.: Manufacture of leavened baked goods.

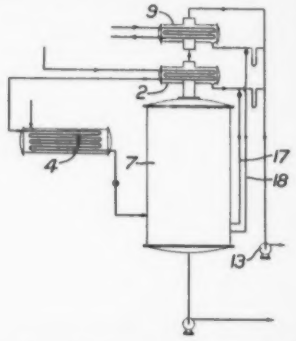
484,668. SEABROOK, J. A. E.: Storage of eggs.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

473,934. **Concentrating milk.** HASS, V. In the production of condensed and sterilised milk the raw milk, after being rapidly preheated in a heater 2 and then heated to sterilising temperature in a heater 4, is subjected to a sudden drop of pressure as it is introduced into an evaporator 7, wherein water vapour is instantaneously released. The vapour is mainly condensed in a cooler 9 after flowing through the pre-



heater 2, and condensates from both may be returned to the evaporator through pipes 17, 18 or withdrawn together with uncondensed vapour by a pump 13. A sterilising temperature of 115° C. is specified, and the evaporator may be below, equal to, or greater than atmospheric pressure.

474,396. **Packages for food.** TRIGGS, W. W. (CONTINENTAL PATENT CORPORATION). The hull of a natural fruit such as an orange or grapefruit is preserved and used as a container for its own preserved fruit or other food substance. The hull may be rendered edible or may merely be preserved by coating. The hull may be cut in half, the edible portion removed, and it or some other edible product packed into the halves. These are assembled again and sealed along their cut edges by sealing-wax, paraffin, etc. A paper cover may be added.

474,978. **Purifying sugar solutions.** NAAMLOOZE VENNOOTSCHAP OCTROOIEN MAATSCHAPPIJ ACTIVIT.
The base-exchange materials manufactured by subjecting carbonaceous materials to the action of dehydrating agents as described—*e.g.*, in Specifications 450,179 and 450,540—are used to effect exchange of cations between electrolytes. Specifications 450,575 and 455,374 also are referred to.

The specification as open to inspection under Section 91 refers to the removal of iron, copper, and other metal impurities from a solution of, *e.g.*, syrup of glucose by passing the solution through a layer of the H base-exchange material in granular form, any resultant acidity in the solution being neutralised with a solution of soda. This subject-matter does not appear in the specification as accepted.

477,600. **Pectin.** BUCHTING, A.
After extracting residual sugar and other substances from sugar beet by extraction with water at a temperature below 70° C., as described in Specification 429,718, the pectin is extracted by treatment below 100° C.—*e.g.*, at 80° to 90° C.—with simultaneous application of pressure. The extracting agent may be a solution of tartaric acid or calcium bisulphite. The extract may be decolorised, filtered, and dried.